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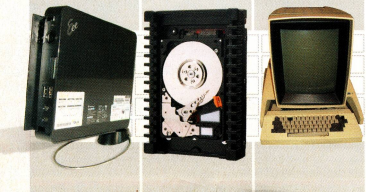
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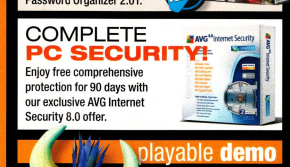


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August DVD production error: *APC* to replace Linux Mint 5 and Zenwalk 5.2

A production error on the *APC* August 2008 DVD resulted in the inclusion of incomplete versions of Linux Mint 5 and Zenwalk 5.2. We regret this error and apologise for any inconvenience it has caused. *APC* will put working versions of these two distributions on next month's disc (the November issue).

Toshiba recommends Windows Vista® Business.

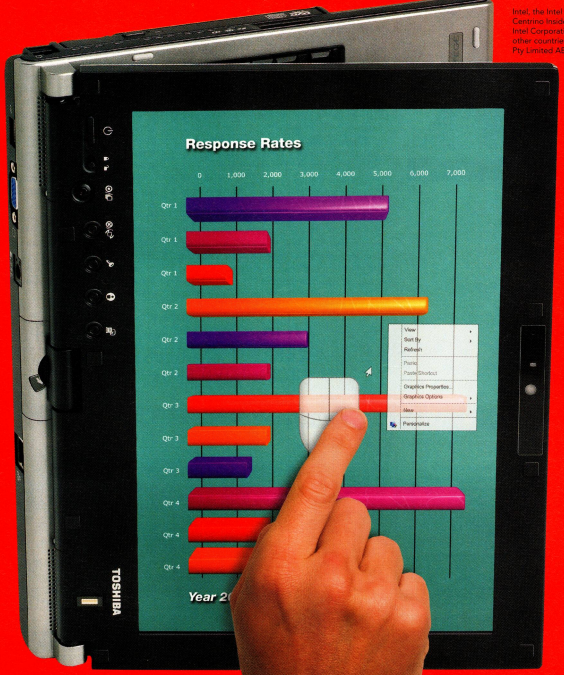
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editorial



TONY SARNO

Ever since I started in PC magazines, I've been trying to reach my holy grail: fully portable computing, or the freedom of being able to work from anywhere and anytime — whether in the office, at home, on the train or on holidays. And I mean not just log in on some slow connection, but connect and work as if I'm on the corporate network, accessing files and internet at Ethernet speeds.

Of course, logging in to the network from home is no big deal, but generally you can't take that kind of access with you on the road. Most of the early mobile network connections available from our telcos were slow or suffered from so much latency that doing anything aside from checking emails was impossible. If you wanted to do real work, you still needed to find a network port somewhere.

Then, recently, I experienced my portable computing epiphany. I was interstate at a swimming carnival, of all places, and desperately needed to edit some *APC* stories on the magazine's content management system. So I fired up a Fujitsu UMPC, connected to the net with a Telstra Next G 7.2Mbit/s card, fired up Citrix Web Access, and worked all day as if I were at my office desk. It was brilliant, a true demonstration that the technology is nearing the point where it enables you to be fully productive from anywhere.

It inspired us to do the cover story on mobile broadband, on page 54. Given my positive experience with the Next G network, the results of the testing we did surprised me. The writer, Dan Warne, tested every major mobile broadband network and came to the conclusion that only one really delivers the kind of quality that makes fully portable computing a reality. So we're not quite there yet, but I still find it encouraging that most telcos are making their mobile broadband plans more affordable, even if their service performance is patchy. Combine this development with the arrival of netbooks such as Asus's Eee PC or Acer's Aspire One and you have light, cheap computers to go with the increasingly affordable mobile broadband. It really is the dawn of a new era for the PC.

We're also excited about the imminent arrival of Microsoft's Small Business Server 2008. SBS 2003 is the server OS that powers thousands of small businesses in Australia, and the new version benefits from the upgraded underlying technologies such as Windows Server 2008, Exchange 2007 and Windows Sharepoint Services 3.

Paul Schnackenburg, who gave the release candidate of SBS 2008 a run for his story on page 8, points out that progress comes at a price — you'll need to upgrade to 64-bit hardware with at least 4GB of RAM on the server. I would have been surprised if that wasn't the case.

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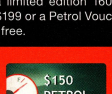
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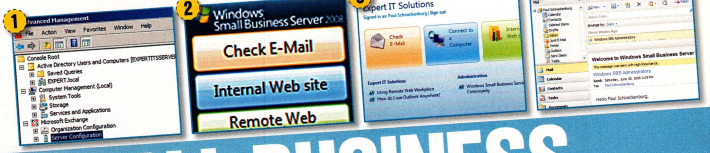
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SMALL BUSINESS SERVER 2008 FORCES HARDWARE UPGRADE

You'll need a 64-bit server with 4GB of RAM to move to Small Business Server 2008 from SBS 2003, reports *Paul Schnackenburg*.

Small Business Server 2003 was a phenomenal success for Microsoft because it conveniently bundled Microsoft's main business platforms, Windows Server, Exchange Server, SharePoint and SQL Server into one package that was easy for small businesses to deploy. SBS 2003 proved to be the perfect solution for any business of up to 75 employees that was ready to leave its peer-to-peer/workgroup network behind and move to a 'real' server network. It offered huge benefits, ranging from centralised management, security and storage, to backup and easy remote access. SBS 2003 also provided very popular technologies such as Remote Web Workplace, the web-based access to mail, collaboration and the office computer desktop. So its successor, SBS 2008, is a massive release for Microsoft.

BIG CHANGES

At its core, SBS continues the tradition by bundling together Windows Server, Exchange Server, SharePoint and SQL Server, updated to their latest incarnations. But there are also some big changes. SBS 2008 works only on 64-bit hardware and systems with a minimum of 4GB of RAM. This is partly to accommodate Exchange 2007, which is 64-bit only, and also to ensure there's ample memory on the server. The cost of SBS 2008 licensing has also gone up.

It's led to some criticisms that Microsoft is asking small businesses running SBS 2003 on lower spec machines to migrate to new servers, or to upgrade their hardware, during these tough economic times. The feeling is that many businesses will stay on SBS 2003 for a lot longer before being tempted by the benefits of SBS 2008.

In addition, Microsoft has also removed Internet Security and Acceleration Server and replaced it with nothing. SBS 2008 is a one-NIC solution, designed to be protected from the internet by a hardware router/firewall or a separate firewall server. The reason for ISA's removal is that it's not best practice to connect your main domain controller and internal mail server directly to the internet, and you don't run a firewall product on the same box as all those other critical services, at least not anywhere else other than in SBS 2003.

Microsoft has so far revealed that SBS 2003 Premium customers with Software Assurance (SA) will receive the license to run ISA on a separate server (this could be the second server in SBS 2008 Premium). Not many small business clients go for the more expensive SA option, however.

TWO FLAVOURS

Like its predecessor, SBS 2008 comes in two flavours: Standard and Premium.

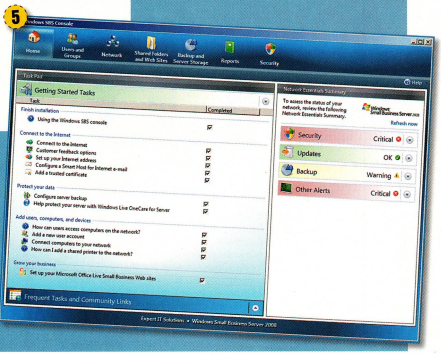
Standard gives you Windows Server 2008 64-bit, Exchange 2007 SP1 Standard, Windows SharePoint Services 3.0, Windows Server Update Services 3.0 SP1, and 120-day trials of Forefront Security for Exchange and Windows Live OneCare for Server.

Premium adds a licence for a second server, running either 32- or 64-bit Windows Server 2008 and SQL Server 2008 Standard for Small Business.

The maximum number of concurrent users in a SBS network is 75, just like in SBS 2003. Be aware that if you have 50 users and above there's a new kid on the block that might be a better fit: Windows Essentials Business Server.

RECOMMENDED HARDWARE

Recommended systems for SBS 2008 will run a 2GHz or faster x64 CPU, 4GB of RAM (maximum is 32GB) and a minimum of 60GB disk space. There are no specific SBS limitations anymore, so any limits are based on the underlying technology — the maximum



1 **The advanced tools are now collected in a separate MMC-based console called Advanced Management Console.**

2 **Once a Vista client has been joined to the domain, you can add an SBS-specific Sidebar gadget.**

3 **Remote Web Workplace (RWW) has had a very nice facelift in SBS 2008.**

4 **Every modern business' must-have, Outlook is also included in the package.**

5 **Small Business Server is served by a new, comprehensive console.**

number of CPU sockets in Windows Server 2008 Standard x64 is four, for instance, so theoretically you could have four quad-core CPUs for a total of 16 cores in SBS! The second server in a Premium setup should also be 2GHz or faster but can be either 32 or 64-bit, have at least 2GB of RAM (maximum for a 32-bit CPU is 4GB and for a 64-bit CPU its 32 GB) and at least 40GB of disk space.

COSTS MORE

In a surprise move, pricing for SBS has increased. Standard will cost US$1,089 (SBS 2003 R2 US$599), Premium will cost US$1,899 (SBS 2003 R2 US$1,299). On the other hand, a Standard CAL (Client Access License) is US$77 compared to US$98 today. A Premium CAL will cost $189; there is no equivalent CAL in SBS 2003.

In a similar fashion to other Microsoft software, you can 'downgrade' SBS. That is, you can run SBS 2003 Standard instead of SBS 2008 Standard until you're ready to upgrade using an SBS 2008 licence. The same goes for SBS 2003 Premium and SBS 2008 Premium. An SBS 2008 CAL can be used in an SBS 2003 network.

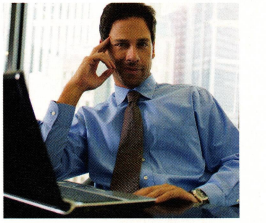
A fresh installation of SBS 2008 is a surprisingly simple affair, as well as a lot faster than an SBS 2003 installation. However, it's impossible to upgrade to SBS 2008 directly from SBS 2003. Since the architecture is different, 32- vs 64-bit, it will always mean a migration. Microsoft only supports a two-box migration. Get a new x64 server; install SBS 2008 in a special migration mode and transfer configuration, data and mailboxes across. Then the old server is retired or reformatted to become the second server in SBS Premium, for instance.

SBS 2008 — THE NEXT BIG THING?

I have been involved with SBS ever since the very first version, 4.0. It took until SBS 2003 for Microsoft to get it right, and the market share reflects SBS 2003's success. SBS 2008 is more of an evolution than a revolution, but with so many strong points, I have no doubt that it will find a home in many small businesses, both existing SBS customers as well as new installations.

Go to APC's web site for technical professionals, APC Pro (http://apcmagpro.com) to find out more about SBS 2008.

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THE (A)PC REVOLUTION

October 1994



DOS IS ALIVE AND WELL

Microsoft has announced that MS-DOS 7 will incorporate multitasking and some other new features planned for Chicago (Also known as Windows 4). IBM says that it, too, will produce a fancy, multitasking PC-DOS 7.

The appeal of the command-line interface cannot be overlooked. Though DOS takes a few moments of study, it can be a powerful tool once learned. DOS has a basic appeal and is unlikely to die out.



OZ-EMAIL'S WORLD WIDE WEB INTERFACE

Oz-Email has a new World-Wide Web interface, codenamed Terrazzo. . . [It] takes advantage of the World-Wide Web to offer a new standard in interactive graphical user interfaces. Long gone are the days when users had to navigate their way through Telnet sessions and FTP protocols. . .

In the pre-alpha version we were able to navigate the Internet in a manner similar to using a Windows Help File. One of the most helpful features is the use of hypertext in documents.

BLACKBERRY BOLD

It's the best BlackBerry yet, strong on business but also taking on the iPhone on the multimedia front.

It was inevitable that RIM would hit back once the iPhone hysteria died down. Its 3G Blackberry Bold is the best BlackBerry yet with a number of key enhancements that range from a revamped UI to better web rendering. But given that BlackBerry's perennial strength has always been email, the big news is that it now finally adds HTML support for its email clients. While it's not full native HTML, it's a subset that RIM's gateway renders into BlackBerry equivalents for the body and heading fonts, along with basic attributes (bold, italic and underlined) before the email is, as always, compressed into a tiny packet. It all means an end to plain old text and code-crammed email newsletters.

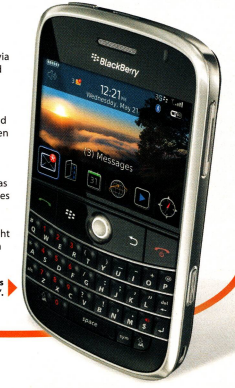
A second part of the Bold's winning email formula is preloaded Documents to Go software for reading Word, Excel and PowerPoint files in Microsoft Office formats. Docs to Go also includes a PDF reader, and the viewers all render documents with an exceptional degree of fidelity, although not every element on the page survives the trip: formatted Word tables came though during our testing, but not charts created from the table data. Office documents can be loaded via a memory card or beamed via Bluetooth. And you can also edit these files. And as you'd expect, the Bold's faster processor and 3G speeds run rings around any previous BlackBerry when it comes to downloading and displaying email attachments, while the screen ensures they're sharper and easier to read.

The Bold's web browser also gets a makeover, with fuller and richer rendering of web pages in their native format. It's still not as good as the iPhone's Safari browser but is miles ahead of any previous BlackBerry.

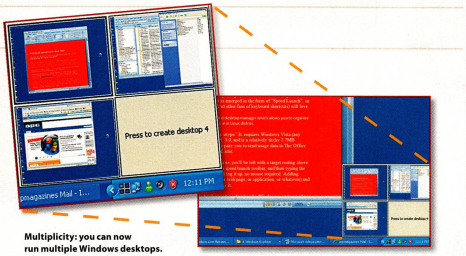
The Bold's keyboard mimics that of the BlackBerry 8800, which nestled the keys tight next to one another rather than have each stand separate as on the BlackBerry Curve, yet RIM has finessed the design to boost usability. The Curve still has the edge in speed and accuracy, but the Bold closes the gap to the point where it's almost a non-issue. It's the slickest-looking BlackBerry ever, elegantly shaped to fit the hand. The vibrant 2.6in panel runs at a sharp half-VGA (480 x 320) resolution that's shown to best effect by a revamped UI replete with stylish icons and subtle transparencies.

The BlackBerry Bold will be available on all four Australian mobile carriers. Optus was first out of the gate with the Bold up for $89 per month (this comprises Optus' standard $79/month plan, which gives you unlimited BlackBerry data and $300 of calls and text, plus a $10 handset fee for the Bold) over 24 months. Telstra says it will offer the Bold on its Next G network, but at time of writing had not advised pricing. Vodafone and Three have yet to advise on pricing, timeframe and availability.

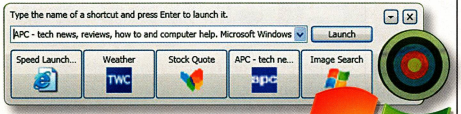
David Flynn



Read all about it: new enhancements make for the 'best BlackBerry yet'.



Multiplicity: you can now run multiple Windows desktops.



Microsoft's Windows enhancements

Microsoft has released an application launcher and virtual desktop manager for Windows Vista and XP.

If there's one thing Microsoft isn't afraid to do, it's dabble in little side projects. Some of them bear fruit in later operating system and application packages, while others flounder.

But a fruitful Microsoft side project has emerged in the form of 'Speed Launch', an application that we suspect many programmers (and other fans of keyboard shortcuts) will love.

Microsoft has also released Desktops v1.0, a virtual desktop manager that allows you to organise any open applications in up to four versions of your desktop, just like in Linux distros.

Described as a community prototype, Speed Launch needs any version of Windows Vista or Windows XP SP2 with .NET Framework 3.0. It's a 2.7MB download from the Office Labs web site.

Installation is swift and painless, and once you're done, you'll be left with a target resting above your system tray. Hitting Windows+C brings up the speed launch toolbar, and then typing the first couple of keys for your preferred activity will bring it up, no mouse required. Adding shortcuts is as simple as grabbing your document (or web page, or application, or whatever) and dragging it to the target, where you'll be able to name it.

It's worth noting that Speed Launch isn't the first such application for Windows systems, with plenty of competition from free applications such as Executor, Launchy or Find And Run Robot.

Desktops v1.0, from Microsoft's Sysinternals team, is useful for de-cluttering your desktop, particularly if you have a smaller monitor and like to keep lots of applications open. You can open different applications in up to four different virtual desktops and easily switch between them. For instance, one can be used for all email and communications, another one for web surfing and so on. You switch through the desktops by clicking on the tray icon or with hotkeys.

Download Speed Launch from **http://www.officelabs.com/projects/speedlaunch/Pages/default.aspx** and you can get Desktops v1.0 from **http://tinyurl.com/5fywm3**.

Alex Kidman

SHE SAYS...



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Meet the collectors

For some people, there's cash in obsolete computers. *Jon Thompson* speaks to these collectors to find out what we should look out for.

They're big, dusty and frequently haven't run in decades, but some old computers still fetch astronomical prices. Systems dating back to the 1960s can change hands for $20,000 or more. What's the big deal about hardware from bygone eras?

THE ACCIDENTAL COLLECTOR

"I began to see some really nice minicomputers go off to landfills and for scrap, and thought it was a shame to see such historically important machines just get junked," says Carl Friend of the Retro-Computing Society (**www.rcsri.org**), based in Providence, Rhode Island. "It made sense to me to try and save a few. It wasn't a desire to have a collection until I already had one."

Friend rescues vintage minicomputers, specifically those made by Data General and the Digital Equipment Corporation (DEC). Companies like these were once household names in the 1960s. Ranging in size from a washing machine to a large wardrobe, the minicomputers they produced were frequently the only number crunchers available to smaller businesses and university departments. They ushered in the era of affordable computing and formed a distinct class of machine for nearly two decades. Given the number of machines he owns (13 Data Generals, 7 DECs, plus a range of smaller workstations), Friend has space problems. He admits: "That's a chronic bone of contention between my wife and I!"

Spousal influence is a common compromising factor for those involved in computer conservation, but in one collector's case, it actually sparked him to begin collecting.

SPOUSAL APPROVAL REQUIRED

"I work out of a home office, and I tend to work odd hours," says Dave Dunfield (**www.classiccmp.org/dunfield**), a Canadian computer consultant and software developer. "One year at the Christmas holidays my wife decreed I would not enter the office during vacation time."

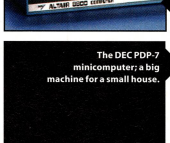
While mooching about in his basement looking for something to do, Dunfield decided to unpack and set up his old MITS Altair 8800. "I have what I believe is one of the first Altair computers to come into Canada," he says.

The Altair was the machine that sparked the home computer revolution in 1975. It came as a mail order kit sold through hobbyist magazines Popular Electronics and Radio Electronics. The Altair also convinced Bill Gates to found Microsoft to market a BASIC interpreter for it.

"With a bit of restoration I had it up and running. As I immersed myself in memories of my early career it occurred to me that these experiences were lost to modern generations and I decided to do what I could to preserve them," recalls Dunfield. "I began by writing a software simulation of my Altair and archiving all of my diskettes as data files that could be used with the simulator. Then I put up a web page with the simulator and a 'photo gallery' of the system itself. Originally it was a single page featuring only my Altair; however it has grown considerably since then."



The Altair 8800 — the machine that sparked a home computing revolution.



The DEC PDP-7 minicomputer; a big machine for a small house.

His extensive collection catalogue site meticulously details the rarity and state of everything he owns, from programmable calculators to his prized Altair. How many of them still work?

"I maintain most of the systems in operating condition," says Dunfield. "I try to check each system at least once a year and perform repairs as required."

WORKING INTO RETIREMENT

Finding replacement parts is becoming more of an effort as time goes by. "When I was first acquiring hardware," says Friend. "I was more interested in the processors than the peripherals. I now realise that was a mistake, as without the peripherals all one has is a heavy box with lights that blink. So, of the minicomputers, about six are in quickly runnable condition; I can mix-and-match some of the peripherals with other CPUs, but that takes time and a lot of effort."

One solution to the spares problem is online forums. Some sites, like The Vintage Computer (**www.vintage-computer.com/vcforum**), are extensive. There's technical support for maintaining, operating and programming old kit, as well as a thriving marketplace where members can buy, sell and exchange parts and even entire systems.

As well as being collectable, Dunfield's machines earn their

go to
apcmagpro.com/computinghistory
for a gallery of the most historic computers in Australia



Saved from destruction: the Data General Nova and Eclipse minicomputers.



keep. "I also use them frequently in data-recovery operations which I do on a contract basis," he says. This is an increasingly important reason for preserving old systems. Data storage formats quickly become obsolete, so collectors are frequently the only ones able to read archives from bygone decades. Much of NASA's data telemetry archive is lost unless someone can read its ancient IBM formats.

"Sometimes the collection gets used in a laboratory manner," adds Friend. "For instance, when the United States changed its Daylight Saving Time law in 2007, a large component of my workstation collection was used to develop and test patches to allow the production machines where I work to ride the change out without problems. I've also used the collection for teaching purposes by way of 'comparative anatomy' in helping people identify computer subsystems."

HIGH-TECH ANTIQUES

With the success of sites like eBay, people have woken up to the idea that most modern cultural artefacts are collectable, and that goes for computers too. Prices are rising, but which systems are particularly worth keeping?

"That's a tough one," says Friend, "and 'most collectible' will vary from collector to collector. I know that PDP-8s are highly sought after and command outrageous sums on places like eBay." He's right. Originally costing $18,000 in 1965, working PDP-8s now fetch between $2,000 and a cool $20,000.

Dunfield agrees: "Interest in classic computing varies all over the map, and a machine which is highly prized by one collector might not be by another," he warns. If it's down to preference, which types of computer attract more collectors than others? "There are a large number of microcomputer collectors (non-PC micros that is) around," says Friend, "and a few folks who collect mainframes, so it varies primarily on the tastes of the individual."

"My own main area of interest is microcomputers," adds Dunfield, "so to my mind the most collectable computers would be the ones based on the Intel 8008. These systems include the Mark-8, the Scelbi and the MIL MOD-8." Also on Dunfield's list are the ultra-rare Kenbak (a pre-microprocessor kit dating back to 1971) and the iconic Apple-1, of which only a few hundred were ever made. It's this scarcity that drives prices up. "I have an Atari Transputer Workstation," says Dunfield. "Only 350 of these were made, and they are highly prized by some collectors."

CASH IN THE ATTIC

So, when you next clear out the shed, garage, or attic, don't throw out those old computers until you've checked the prices they fetch on eBay. We found a Sinclair ZX80 in working order for $165, with eight bids against it and three days left to go — and on the US site was a working Commodore 64 home computer from 1982 with a Buy Now price of $700.

THE MOST WANTED LIST

Though each computer collection is personal to its owner, some machines are always in demand. The following systems are thought to be the world's most collectable:



The Apple-1

Designed and hand-built by founder Steve Wozniak, this was Apple Computers' first product, of which only 200 were ever made. Costing $666.66 in 1975, they often fetch over $10,000 at auction and have commanded up to $50,000.

Altair 8800

In 1975, this machine kick-started a revolution and started Microsoft on its path to world domination. They now fetch over $20,000 each.





Apple Lisa

Released in 1982, the Apple Lisa was the first mass-market machine to include a graphical user interface (GUI). This computer still fetches prices over $10,000.

Xerox Alto

In 1973, the Alto was a decade ahead of its time. This was the first machine ever to include a GUI, Ethernet networking and a mouse. Very few survive, and those that do change hands for over $10,000.





Commodore 64

Though 17 million were produced in the early 1980s, nostalgia and some excellent games make this a machine that's as collectable as it is affordable.

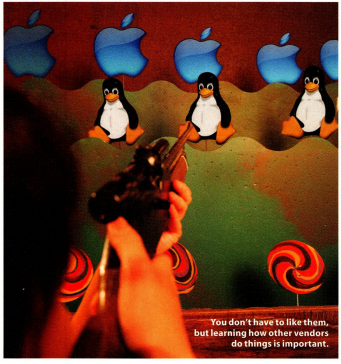
LDAPs not that lightweight

Doing things the Microsoft way might be how Redmond likes it, but you won't do yourself any favours.

Last month I had a bit of a rant against Linux and Mac. And very refreshing it was. This month I've resisted the temptation to stick the boot in again and am going to discuss what we Windows users can learn from other platforms.

The problem with having a Microsoft-centric approach to IT is that you tend to get stuck in a particular mode of thought. If you've ever done vendor product training, you'll have experienced how the course material tries to avoid mentioning the existence of competitor products at all costs. But the reality is that there's no such thing as a 100% vendor-specific environment — most enterprise networks are an amalgamation of different tech, and the skill of the IT admin is in making them work together.

Exposure to different platforms gives you a broader depth of understanding of what's out there. It also makes you more aware of the shortcomings of your platform of choice. As much as I like Windows, my systems background is in Novell Netware and eDirectory, and after the absolute ease of administering a large network on that platform, trying to do more with Windows/Active Directory is a painful experience.



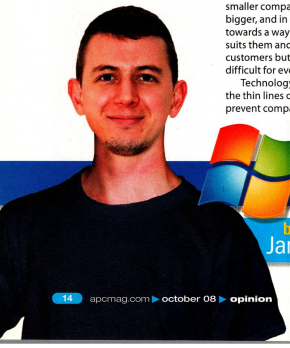
You don't have to like them, but learning how other vendors do things is important.

Why? One word — standards. The evolution of the IT industry has resulted in dozens of viable platforms, hundreds of enterprise-standard applications and thousands of ways of achieving the same thing. Big companies absorb smaller companies and become bigger, and in doing so move towards a way of doing things that suits them and their existing customers but which makes life difficult for everyone else.

Technology standards are the thin lines of cohesion which prevent companies from completely alienating entire sections of the industry. Some standards are so strong that no-one can afford not to pay them homage — TCP/IP, DNS, DHCP and so on. But other standards seem to be open to interpretation — you can adhere to them, yet implement them in whatever way you see fit. LDAP — Lightweight Directory Access Protocol — is an excellent example of this. eDirectory is fully LDAP-compliant, which makes it highly interoperable with other LDAP-compliant systems. OpenLDAP, for example. Active Directory is an LDAP system too, but Microsoft's implementation of LDAP has been done in such a way as to make true interoperability with other systems virtually impossible.

The cynics out there will claim that this is because Microsoft isn't in the least bit interested in playing nicely with its competitors, and while this may be true I think the problem lies deeper. Active Directory is absolutely dependent on DNS, to a degree that is quite spectacular. If DNS breaks, AD quickly tumbles. The LDAP naming structure of AD reflects this dependence and stands in obvious opposition to other systems, which have evolved while maintaining full standards compliance, and so we are now in a situation where one of Microsoft's flagship products is left looking rather exposed and somewhat unimpressive.

This is the cost of doing things your own way for too long, and adopting what could be likened to an isolationist policy. The same principle applies to users in the IT industry. Just because you're used to doing things one way, and just because you're comfortable on a particular platform, doesn't mean that other platforms don't have anything to offer. You don't ever have to like them (for example, I can't stand Apple products — they offend me) but learning about how other vendors do things is invaluable. It broadens your knowledge and lets you troubleshoot creatively. You've no idea how much running up Linux improves your understanding of Windows!



Windows view

by James Bannan

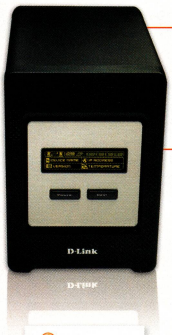
James Bannan is a systems manager at St Leonard's College (Vic) and APC's resident Windows expert. He'll be checking out Windows for you every month.

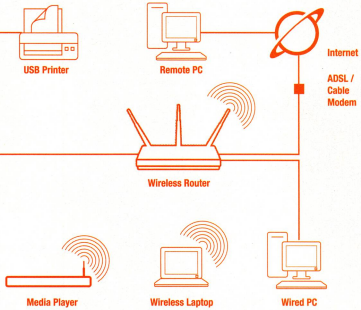


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Intrepidation

In tune with Ubuntu's six-month release cycle, the next version (8.10, aka Intrepid Ibex) is rapidly approaching. What new toys and trinkets can we expect to see?

While Ubuntu 8.04 made quite a splash on release, there is, for better or for worse, a perception that the second '.10' release of the version cycle provides for a more polished distribution. Even though the current version of Ubuntu sits at 8.04.1, with some necessary updates that include, for example, the final Firefox 3.0 release, nevertheless everyone is looking forward to Ubuntu 8.10, aka Intrepid Ibex.

And what's new with Intrepid? Glad you asked — there are quite a few significant updates, apart from newer versions of applications. The latest XOrg server is included and with it, for the first time, a means of running without an xorg.conf file which should help for troubleshooting. The kernel version will be 2.6.26-based, which, on its own, includes a wealth of new hardware support. Also new is an encrypted 'Private' directory for each user to store sensitive information, a new 'guest' session that allows you to allow others to briefly use your machine without the need to create a new user account, and an all-new Network Manager with 3G support. PulseAudio sees some improvements (as it was a wee bit broken in 8.04), and a new version of Compiz includes new effects to play with. Finally, OpenOffice 3.0 will be bundled (and the latest Gnome 2.24 release).

But the one feature that has received the most attention — or rather, scrutiny — is a new visual theme for Ubuntu: NewHuman. In fact, this theme proposed for Intrepid has been met with. . . some trepidation. Based around dark orange and chocolate colours, it's a stark departure from the default and one that set the community alight — in discussions and polls on the forums the overwhelming response has been that it is, in short, ugly (note I'm being kind here — stronger words were used!).

It's interesting in that while I'm personally all for a visual overhaul, all themes are optional anyway, so regardless of what is installed the look and feel can be changed by the user. Still, first impressions last and, while the darker look has potential, it's certainly not as welcoming as the current theme. So it's no surprise that, after the backlash, the most recent Alpha 4 of Intrepid just released has reverted the theme from NewHuman back to Ubuntu's default Human (actually, a slightly updated version with nicer widgets). Still, NewHuman is present in the Appearance dialog for anyone wanting to give it a go.

Ostensibly, the push for a new style came from Ubuntu founder Mark Shuttleworth himself, who stated a goal of surpassing the Mac for visual appeal with Ubuntu. Nice, it's definitely a good thing to aim high, but is Gnome really capable of achieving this on its own? Unless the plan is to use nifty docks like AWN (the Avant Window Navigator, and which can in fact perfectly emulate the Mac OS X dock right down to 3D effects), Gnome doesn't have the ability, at the moment, to match it. KDE 4.1 might be closer here in terms of visual appeal, but it's quite a departure from Gnome in terms of usability and, of course, Kubuntu isn't the 'standard' Ubuntu as we know.

All up, Intrepid Ibex looks to be a better Ubuntu 8.04 and, unless there's a marked improvement in NewHuman, there won't be a new look for the OS yet. Intrepid is due for release at the end of October. To check out the latest beta or release candidate, visit **http://cdimage.ubuntu.com/releases**. apc



8.04 part two? Intrepid users stand to gain the benefits of the revision.

LinuxWindow

by Ashton Mills

Editor of the **Linux Pocketbooks** *series, and now with CHOICE magazine, Ashton has been a tech journo for over 12 years, including five years with* APC.

Officer **in trouble!**

When a policeman runs into trouble with technology, he calls the IT department.

Reader Jenny Smith* from Sydney was working at the IT helpdesk for a police department when she received an after-hours call from a police officer having computer difficulties…

Jenny: What's the problem?
Cop: The computer is not accepting my number.
Jenny: Your number? You mean your user ID?
Cop: Yeah, it's not working. *Jenny ran him through the logon to the police mainframe, step-by-step.*
Jenny: (*frustrated*) So you are on the main logon screen, and typing your user ID and password and pressing enter?
Cop: Yes and now it's not accepting my card.
Jenny: Card?
Cop: Yeah, I put my card in and type my number and nothing.
Jenny: Where do you insert the card?
Cop: In the slot on the computer.
Jenny: Uh-huh (*thinking, 'what the hell?'*). What's on the card?
Cop: My account number.
Jenny: Account number? What else is on the card?
Cop: The credit union logo.
Jenny: It's an ATM card?
Cop: Yeah, it's a Police Credit Union ATM card. I've been trying to get money out of the ATM machine but it won't accept my number.
Jenny: ATM machine? Sorry, you need to contact the credit union — we only deal with police computer problems.
Note: **APC* has verified that this story is true, but we have changed Jenny's surname for anonymity since she still works for a government department.

MYOPIC NANA

Robert Hopkins, from Adelaide, says his grandmother is famous for her blunders: "Whether it's mistaking a food mixer for a hair dryer or walking out of the cinemas with her arm around the wrong man, she's a reliable source for a good laugh." Hopkins remembers an incident in which his sister Rebecca was attempting to help nanna close a program by assisting her over the phone. He says: "The close button in the top right was just off screen and she was having trouble moving the window. Luckily Rebecca knew about Alt + F4. But even when my grandmother worked out you needed to press the keys at the same time, it still didn't work. Finally Rebecca was forced to pay her a visit and found that nanna was pressing Alt + F + 4. The thing I find most disturbing is that after 10 years of owning a computer, my grandmother never once noticed the function keys at the top of her keyboard."

NANNA WRITES IN

Just as End User was having a good laugh about Hopkins' nanna, we got an email from another nanna, Janna Goodland, of Montrose, Tasmania.

She was worried she was missing out by not trying Linux but was reassured by James Bannan's column in September about the primacy of Windows. "Thank you James Bannan for the article *King of the Universe* (*APC* September, page 19). I struggle to understand a lot of the information in *APC* and I've been watching those articles on Ubuntu and wondering if it is the coming thing and Windows will go. James put everything into perspective and I will stick with Windows."

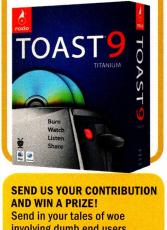
Goodland then took us to task for not making *APC* more accessible. "It would also help if the articles were tagged 'Any fool can understand this' or 'Just don't bother' so I don't waste my time trying to get a handle on stuff that is way beyond me."

Just warming up, she then offered some constructive advice about *APC*'s games section. "I often wish *APC* would run a Grannies page. I could use some reviews of games that don't feature dragons, dungeons, Lara Croft (has she got a personable grandpa?) and explosions."

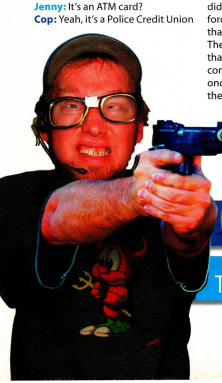
But Goodland also had a good laugh at herself. "A lot of those End User stories could have been me. I remember my first use of someone else's computer. When it came to switching it off I was flummoxed. I could see the Start button — no trouble — but where was the Stop button? I even picked the computer up and looked underneath…" RTLC

WINNERS!

The launch of Roxio Toast 9 Titanium redefines Mac burning. Toast 9 allows consumers to record high-def content from high-def camcorders and Blu-ray discs, as well as their favourite HD programming from Elgato's EyeTV devices. Users also have the option to burn HD video and slide shows on standard DVDs. For on-the-go entertainment, Toast 9 introduces Roxio Streamer, which allows users to stream video content stored on their Mac to a Wi-Fi connected iPhone or iPod Touch or any internet connected Mac or PC. Toast 9 also offers the ability to capture streaming audio for recording internet radio, and allows captured music tracks to be automatically tagged with song titles, artist or other related information. RRP $179.95 inc GST. Also up for grabs are two copies of Roxio Easy Media Creator 10, Roxio's Vista-ready flagship suite of digital media applications worth $159.95.



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EndUser

from The readers of *APC*

APC readers who deal with new computer users or incompetent IT administrators share their survival stories.

MYOB support: MIA so BYO?

Nothing gets readers aggravated like a lack of paid-for customer support, especially when the solution is a simple one. Watchdog investigates.

Recently I was contacted by a business that had to reinstall their MYOB RetailManager — no real problem, they thought. They had a small network of a server and a counter machine.

I had supplied them with a new server and they reinstalled the RetailManager and restored from backup. When they plugged back into the network, the network was fine, files could be moved from one machine to the other, they could print, everything was fine.

This was when the trouble started! The problem was the inability of RetailManager to reconnect to the server to complete the installation.

When they contacted MYOB support, which they pay over $700 a year for, they said it was a network problem and hence they would not support it! The only advice they gave was to do a fresh installation of the counter machine.

The poor business then did the following: after one whole day lost by their IT person trying to work out what was wrong and not getting support from MYOB — he rang them about 4 times — he brought the counter machine to me for a fresh installation.

They operated the business for a week with only the server to process transactions as the IT person had to have a week off work and was unable to be present when the system was returned.

After the fresh installation, the counter machine could not install the link back to the server of the MYOB. After three hours and three technicians who all said it was not MYOB's problem, a fourth tech solved the problem by directing the IT guy to the permission settings and making changes there.

As you can imagine, the IT person was extremely frustrated at the lack of support for a problem that should have been easily identified by MYOB support and fixed in the first phone call.

For heaven's sake, it is MYOB's product and they should know about setting permissions for their own product. The business paid good money for support, and getting the solution was — according to MYOB — only a fluke (that someone knew of this problem from being a field technician).

I find it unbelievable that MYOB when contacted afterwards by the IT person said it was not their problem and hence the business would wear the cost of many phone calls, wasted work hours and an unneeded fresh installation.

Does this sort of thing happen often with the likes of MYOB? I use Quickbooks and pay for the Advantage support; never a problem and always understanding/solving any issues.

A client of mine was looking at RetailManager, but, after me telling him of the problems this business had, he is now very nervous about getting involved with this mob!

Steve Schier
Gilgandra Observatory Computers
Gilgandra, NSW

We asked MYOB to respond to Steve's accusations and to account for the lack of support as described. Here's what they had to say:

Dear Watchdog,

Thank you for the opportunity to respond to *APC* regarding a letter you received from Mr Schier about MYOB RetailManager.

We understand the level of frustration felt when a business experiences IT issues. MYOB's Technical Support Team are dedicated to assisting our clients solve their issues relating to their use of MYOB software.

MYOB avoids discussing the specific details of individual client cases in a public forum. Based on the information provided in Mr Schier's letter, it appears that the technical issue related to permissions in the computer system/network used. When a technical issue relates to a client's computer network and not with the MYOB software itself, clients are advised to seek advice from a qualified IT network specialist.

Networked environments can be complex, and many variables are involved. MYOB makes every effort to support our clients in the use of their MYOB software (through our MYOB Technical Support Team). As is common across most organisations that provide support for business software, diagnosing network and system configuration issues related to the computer systems/networks used by clients is outside the scope of our Technical Support program. The best port of call for this type of advice is a qualified IT network specialist who can make an onsite visit and evaluate and address the many factors that can contribute to networking issues.

If clients would like to provide feedback on support provided to them by MYOB, we invite them to contact us through the support channel on our web site, **www.myob.com.au/support**, and discuss their case with a Manager in the Technical Support Team.

Chris Pattas
General Manager, Business Division
MYOB Australia

Steve remained unimpressed by MYOB's position on the issue: "I'm a little surprised that they don't want to update their support procedures to check this when a customer has a problem, as it is an easy fix if pointed out. There was nothing really special about what we had done; we followed their installation instructions and when it wouldn't work we rang them up. The fact that they brushed off support by saying it was a network problem that we had to solve (when in fact it was their software which was having the problem, as the network was working fine) is the problem.

"I'm trying to help them by saying add this check into your support steps to check and in the future they will be able to provide better support to their customers."



Check what your 'support' arrangement actually covers — it might not be what you think.

ASYS COMPUTERS: TWO MONTHS' DELAY, NOTHING TO SAY

Most *APC* readers are aware of some of the perils of shopping online. None more so than David Penton of Canberra, who wrote in to complain of what he called a "non-responsive internet trader". David bought a digital recording device from Asys Computers, Queensland, and paid via online bank transfer on the day of the purchase. However, to his concern, he noted that the status of the account remained marked as "payment pending". David sent numerous emails to Asys to obtain an update on the order, but was met with silence.

"The company has completely ignored me. I have tried the site's 'live help' icon; it is not working. I left several messages at their 'customer support' interface, again with no response."

Further, David faxed and called Asys, but was unable to get through. "This is becoming extremely frustrating — for whatever reason (the item isn't in stock, or they are just poorly organised), they have gone to ground and are refusing to communicate with me. All I want is for them is to acknowledge payment and tell me what's happening!"

***APC* passed David's concerns onto Asys, only to be attacked by the trader for the delay between his email to us and our referral to the shop: "It is of concern that you deliberately withheld this complaint. . . Clearly you do not have the complainant's interests at heart. . . As the so-called and self-appointed industry 'watchdog' this (lack of) action on your part is quite ironic, if not negligent. Furthermore, by withholding this issue from us and for so long you have in fact grossly contributed to it at our and the complainant's expense." Asys refused to answer Watchdog's appeals for an explanation of David's order. David eventually received his first communication from Asys: an email explaining that the item was 'out of stock', before finally taking delivery of his kit: "Taking over two months to deliver must be some sort of record, although I could have lived with the delay if they'd just told me what was happening. I don't understand their logic — if they had kept me informed I may have used them again; however, after all that's happened I wouldn't touch them again with a barge pole."**

KNOCKIN' NOKIA

I am currently having issues with my Nokia N95, which has poor battery life and even poorer network reception. I upgraded to the N95 in January, after having a trusty Sony Ericsson V600i, which had great battery life and good network reception.

I have today contacted Vodafone who tell me the matter must be dealt with by Nokia. I have contacted Nokia who have told me that they prefer it if I take the phone to a service centre, but the nearest one is in Parramatta and I am out in Bathurst. Nokia's next suggestion was for me to post it to them and enclose a bag for them to return the phone when it is repaired or looked at. Furthermore, Nokia will not repair the phone if it is damaged between my place and theirs.

To rub further salt into the wound, Nokia will not send a loan phone while it is being repaired which can take up to six weeks. Their opinion on this seems to be 'bad luck'.

If I knew that the N95 had such poor reception and battery life, I would have purchased a SE smartphone instead.

Nathan Carter
Bathurst, NSW

Nokia Australia's Communication Manager Louise Turner offered APC the following response:

Dear Watchdog,

Thanks for bringing this complaint to our attention.

We will have someone from our Care team contact your reader to get some more specific details to see how we can help him resolve his issue.

Nokia has more dedicated walk-in Customer Care facilities than any other mobile manufacturer in Australia, with 12 Nokia Care Centres located around the country.

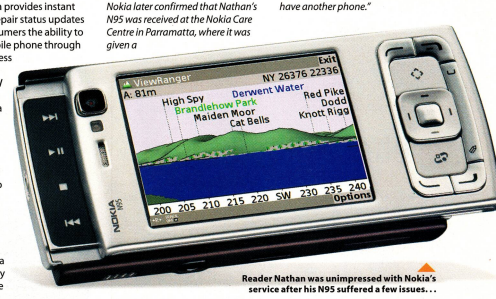
The benefits of going direct to walk-in Nokia Care Centre if there is one close-by to you include:

- Only Nokia provides instant SMS or email repair status updates and gives consumers the ability to track their mobile phone through the repair process online (**www.nokia.com.au/repairstatus**).
- Only Nokia has 'Customer Charter' which promises to resolve a customer issue that comes into our Nokia Care Centre within three business days, or Nokia will provide a customer with a complementary and compatible Nokia genuine accessory (**www.nokia.com.au/support/customercharter**).

For customers in regional and rural areas, if you have manufacturing issues with your handset, especially within the warranty period, you can take it back to your retailer (with proof of purchase) where you bought the mobile phone or your can call the Nokia Care Line on 1300 366 733.

Louise Ingram
Nokia Australia Communications Manager

Nokia later confirmed that Nathan's N95 was received at the Nokia Care Centre in Parramatta, where it was given a software upgrade and returned to him. However, Nathan claimed that when he received the phone back it was damaged: "There were marks where you could see where they had prised it apart with a screwdriver. I sent it back to them, they replaced the casing and returned it. Frankly, I am utterly disappointed with Nokia's service and it has made me think twice about ever buying a Nokia again. Unfortunately, the phone still didn't work as expected, so I contacted Vodafone and they end-dated my contract. The N95 found itself a nice home in the recycling and I now have another phone."



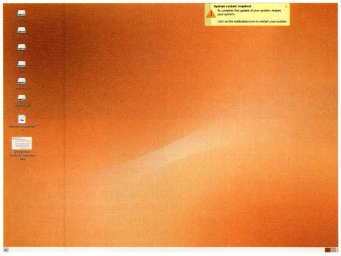
Reader Nathan was unimpressed with Nokia's service after his N95 suffered a few issues. . .

watchdog@acpmagazines.com.au

Has an IT vendor or telco stuffed you around? Let us know about it and we'll chase them for a solution on your behalf. Letters sent to watchdog@acpmagazines.com.au must include the writer's full name, street address, suburb, state and phone number to be considered for print publication (please also include details such as invoice numbers and people you've spoken to). Address and phone details will not be published. All correspondence becomes the property of *APC* and is subject to editing.

The never-ending **OS wars**

Our July cover story on Ubuntu had many readers try the OS, with mixed reactions.



Ubuntu's Gnome desktop: at least one reader finds it extremely ugly!

UBUNTU OVERRATED

Dear *APC*, while I applaud your support of Linux, I have to question your choice of Linux distributions. Ubuntu may be a stable and reliable Linux but, for those migrating from Windows, its Gnome desktop is extremely ugly. Secondly, it is widely accepted within the Linux community that the alternative desktop KDE 3.5 is closer in appearance and usability to Windows. If I were coming from either XP or Vista and saw Ubuntu I think I'd be put off Linux for ever. If you want to promote Linux then I suggest you use a distro that utilises a more familiar interface for the Windows user, such as PCLinuxOS, Mandriva or Linux Mint KDE.

The transition from Windows to Linux is an interesting journey and has been well worth the effort, but it needs to be made more 'inviting' for the curious.

Rod McLaren
Mooroolbark, Vic

UBUNTU IS SPOT ON

You are right on the money with your assessment of Ubuntu (*APC* July). I have been trying to downgrade (upgrade?) Vista to XP ever since I purchased my HP Pavilion DV9615TX — without any success.

I tried Ubuntu today and everything works, and even better than it did in Vista! No matter what I tried while using XP, I could not install various drivers for wireless and Ethernet, or codecs for my media player, but they all worked on Ubuntu. Now I can finally play AVIs with my choice of player and the results are simply stunning.

My laptop is now impressively running to it fullest potential. Thanks for providing the ISO and recommending I give it a try. No need to look back.

Justin Richards
Padbury, WA

WE WANT CHOICE

It's about time that all computer companies offered their products with a choice of operating systems. We should be able to choose whether to have Vista or Ubuntu or any other major OS for our new PC or laptop. And if we choose one of the open-licence OSs then the computer should be offered at a reduced price (less the wholesale price of Vista, for example).

I recently bought a laptop directly from Dell, which came with Vista pre-installed. When I asked if I could buy it without Vista, at a reduced price, I was told 'No'. End of story. I choose to run Ubuntu, so the money I paid for Vista was a waste.

Come on guys, wake up and give savvy consumers a real value-for-money choice.

Anthony Nabkey
Woodville Park, SA

WINDOWS UPDATE

I recently had an experience which to me highlights some shortcomings with Windows Update. I purchased a notebook with Win XP Pro. One of the first things I did was to go to the MS Update site and install all the 'High Priority' updates.

I then decided to install some of the 'Recommended' updates. Firstly, I installed .NET 1.1, but after rebooting and checking the web

letter of the **month**

WHY REBATES?

In response to the question posed by Gordon Drennan of Burton, SA, the reason why companies offer bonuses, rebates or cashback offers with products rather than simply reducing the price of the item is because less than 30 per cent of these vouchers are ever presented.

Yes, I do redeem these vouchers if they come with anything I buy, but most do not.

But then it's not just individuals who ignore these vouchers. Along the same lines, I offer my clients a 10 per cent deduction if they pay their bills by the due date because many just don't pay on time. Many of my clients don't take advantage of this offer. Some will pay a week after the discount expires, despite the fact that I send them a reminder a couple of days before the bill is due.

So it seems some people will just not change. Many miss out on some pretty substantial discounts if they would only exert themselves just a little (and winning). This should allow users to be able to select from a range of quality products without a big name (or big price tag) being forced upon them.

Brad Coates
Albury, NSW

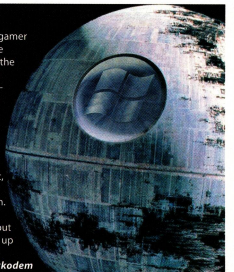


Brad wins this issue's Letter of the Month prize, a Logitech Cordless Wave Desktop keyboard and mouse set valued at $179.95.

WINDOWS HATERS

In your July issue, *APC* seems once again to be trying to prove that Ubuntu is a Windows killer!

Why does everyone dump on the big dreaded Micro Death Star as if it represented everything bad in the world? Windows is not perfect and Vista isn't Leopard, but I can do more with them on my computers (since they are cheap PC machines) than I can with any other OS. Ubuntu is a nice project — perhaps in five to ten years they will really have something there. However, it's just too slow for me to run anything. Like many PC owners, I'm a gamer and all my machines are made to run fast. Even the holier-than-thou Apple OS can't run top-of-the-line games as fast (plus you have to wait six months for them to be released for Apple) as a stripped-down PC can. I still believe we owe something to Microsoft, since we wouldn't be here at all without them. Sure, they're less than perfect in many ways, but the alternatives are not up to speed yet!



Paul Nickodem
Sydney, NSW

site I received a 'High Priority' update to fix a security issue. I installed this, rebooted and went back to the update site.

I then installed .NET 2.0 from the 'Recommended' groups as I was planning on installing NET.Paint to replace the vanilla Paint program. Once again, after installing this update (about 24MB) I rebooted and checked the update site only to find I had three 'High Priority' fixes needed for .NET 2.0, with these totalling a further 17.6MB in downloads. My question is, why can't Microsoft, knowing there's security fixes required for various components — for example, .NET — have these already rolled into the one download for people visiting the update site.

Surely their system should be able to work out whether:

a) the user already has .NET 2.0 installed prior to the 'hot fix' and therefore needs these 'high priority' downloads; or

b) hasn't got .NET 2.0 installed, for example, and then just show an updated all-in-one download for it.

Max Schafer
Thornton, NSW

AD BLOCKING

I am intrigued by the debates on ad-blocking plug-ins like Adblock plus.

In print I can choose not to read the advertising. On TV I can record a program and fast-forward through the intrusive ads. Why shouldn't I be able to choose whether or not to view the advertising on a web site?

Kudos to the people at Firefox for developing Adblock plus. If sites want to stop me from visiting because I choose not to view their ads then they'll just have to lose my business. I'll just concentrate on one of the multitude of other sites that *don't* block Firefox.

Dieter Opfer
Tweed Heads, NSW

WHAT'S A WATT?

What is this nonsense about the Greenest PC using only 1,384 watts over 24 hours when it has a 300-watt PSU? (September *APC*, page 8.) This confusion between energy and power seemed to be present throughout the article. I guess Nick Race was really referring to an energy usage of 1,384 watt hours over 24 hours. Maybe it would have been clearer to use the same units as our electricity suppliers do, namely kWh.

Ferg Brand
Lane Cove, NSW



epinions@acpmagazines.com.au

Come on, have your say! We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to epinions@acpmagazines.com.au. All correspondence becomes the property of *APC* and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication and to be in the running for Letter of the Month prizes. Address and phone details will not be published.

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acp magazines pblMedia
APC magazine is published by ACP Magazines – a division of PBL Media Pty Limited

ACP

Group Publisher Phil Scott
Advertising Director Andrew Cook
National Sales Director, Men's & Specialist Louise Barrett
Publisher, Men's & Specialist Michael Koslowski
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This month in Labs. . .

Where you least expect it

This month, one of the most frustrating parts of computing came up and bit me. Now, it's a given when you walk the cutting edge of technology that things can and will go wrong. Systems crash, some smoulder, and the ever-present tang of the 'magical blue smoke' that makes electronics work lies heavily in the Lab's air.

Everyone gets frustrated when something doesn't work right, and the expectation that you should be able to turn on a PC and do what you need without any major hurdles coming up is acceptable. But it doesn't always work like that. Working with computing systems, which are astoundingly complex both in software and hardware, means that from time to time something won't work as it's expected to and it's our privilege to get to try and troubleshoot it.

Our games reviewer, Troy Coleman, is more an end user kind of guy than a super geek. He knows Adobe Photoshop and InDesign like the back of his hand,and is more than capable of managing a computer system day to day — that is, until something goes wrong. As a games enthusiast, he likes to spend his lunch time playing. After a hiatus from his MMO of choice (and during which time we built him a state of the art gaming rig to test PC games for *APC*) he returned to that world only to have recurring and complete system crashes with monotonous regularity. But the system was solid, the client for the MMO was solid and, really, there was no real reason to see the entire system brought to its knees.

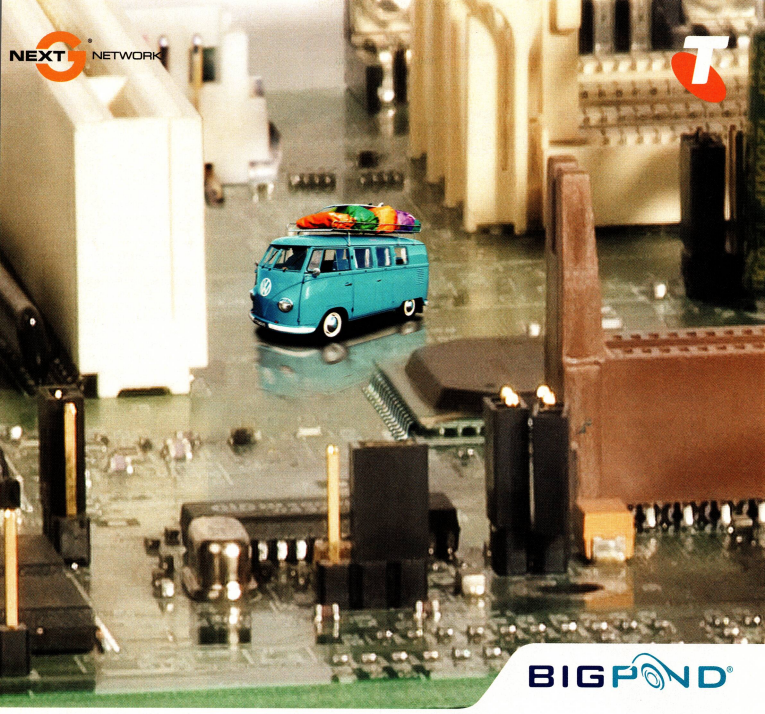
So we tested the PC, for hours, but we couldn't get it to crash under heavy load, or for any reason. Finally, Troy found the solution on the MMO's forums: someone had figured out an incompatibility with the Logitech G15 keyboard. During all this, the PC hadn't even been crashing, but the usual methods of testing to see if the system was still responding (by hitting the Num Lock key, and attempting to Alt-Tab out of the now black screen) were all for naught, as the keyboard itself was in question. The fix involved unplugging and replugging the keyboard every time it went to a black screen — or, in our case, just swapping it for another keyboard. No more crashes.

This was one of the most bizarre things I'd had to troubleshoot in my time, and truthfully, I still don't understand what the problem was, or who's responsible for it, as it affected a relatively small amount of users. Is it fixed? No, but it could be worked around, and Troy's lunchtimes are now once again filled with Elves and Hobbits. ELITE



> IN TYPICAL I.T. FASHION, THE PROBLEM WAS RIGHT IN FRONT OF US THE ENTIRE TIME, AND WE DIDN'T EVEN CONSIDER IT AS A FACTOR

NICK RACE – TECHNICAL EDITOR



BIGPOND® WIRELESS BROADBAND IS NOW BUILT-IN.

First we removed the wires. Now we've even done away with the plug-in device. BigPond Wireless Broadband is now built-in to best-selling laptops. BigPond Built-In lets you connect to the internet without needing wires or plugging in an external device. You simply click to connect. This means your laptop is as mobile as your Next G™ phone, and because the Next G™ network* covers 99% of the Australian population you can use your BigPond Wireless Broadband in more places and get things done faster than ever before. Better yet, the Next G™ network has a drop out rate of less than 1% so you'll experience fewer difficulties*. It's all backed by our award-winning service, available 24/7, so if you ever need help we'll always be on hand. Ask for BigPond Built-In when you're shopping for a new laptop. CALL 13POND or visit bigpond.com for more information.

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ASUS Eee Box B202

Affordable and compact, ASUS's new mini-desktop is not without its flaws.

- CONTACT ASUS
- ONLINE www.asus.com.au
- MARKET Everyone
- PRICE $429

✔ Slick design; quiet and cool.

✖ Slow performance; no optical drive.

9/10

The Eee PC netbook singlehandedly created a whole new genre of computing products, with many vendors jumping on board to mirror ASUS's success. We think it's great: there's now a wide choice of netbooks to buy, and they're excellent for on-the-go computing, entertainment, (and a godsend for parents).

ASUS's attempt to crack the budget desktop market with the Eee Box might not be as well thought out. The problem here is that there was already a large market of budget desktop computers. Whereas the Eee PC gave consumers something they'd not been able to get before (sub-$900 notebooks were far from common), the Eee Box is competing in an area where desktop systems are available at the price point they've chosen, and further to that they're faster, more expandable and offer better value.

Leveraging the technology from the new generation of Eee PCs, the Eee Box is built around one of Intel's new Atom processors, the N270. The N270 runs at 1.6GHz, offers one core and two threads. The Eee Box uses Intel's i945GME northbridge and the 82801GHM (ICH7) southbridge. There's 1GB RAM installed and an 80GB Seagate hard disk drive. Eee Boxes currently ship with Windows XP Home and ExpressGate "instant on" web browser/Skype solution.

On a very positive note, the Eee Box supports Draft 802.11n provided by Ralink and a Gigabit Ethernet connection using a Realtek chip. The whole system is squeezed into a very slick-looking chassis measuring 44m high by 177mm wide and 222mm deep. Unfortunately, the Eee Box can't lay flat on the desk due to cooling and air flow constraints, so you're forced to mount the system on a provided wire-footed stand or attach it to the back of your monitor, using a VESA bracket.

So now we know what it is, let's focus on what we liked about the Eee Box. Most of all, it looks great. It's understated and would suit a small desk space or a HTPC setup nicely.

Secondly, we like the price. At $429 it's a good solution for the kids' room, a second PC to mess around on or a cheap media centre for playback over a network.

We like that ASUS has included 802.11 (Draft) N and Gigabit Ethernet for maximum utility in a networked environment. We like that it draws just over 20 watts of power and that it's almost silent.

Now, there are things about the Eee Box that we really don't like. Firstly, we dislike the door on the front of the unit that covers the USB ports and power button. It's flimsy and could break quite easily. We're disappointed the design demands the use of the stand or monitor mounting bracket; it gives a false impression of the footprint of the unit, which is much larger when the stand is attached. We don't like not having an optical drive, which limits its appeal in the loungeroom (and may mean investment in a USB optical drive is necessary).

The monitor-mounting system isn't without its issues as well. A quick poke around the *APC* Labs saw the Eee able to be mounted on two of the six monitors we looked at. A rule of thumb from our small sample showed monitors with adjustable stands couldn't accommodate the Eee Box but those with fixed stands could, which means that mounting the Eee Box can sometimes be a hit-or-miss affair.

My major dissatisfaction with the Eee Box is that its performance is akin to the ground speed of a concrete-covered tortoise. For the same price you could buy a desktop style PC from any number of PC builders that would run rings around the Eee Box — *and* they are much more upgradable to boot. A quick look and we found a system from Pioneer Computers that offered a dual-core Intel E2180 processor, 1GB of RAM and a 160GB hard disk drive for $449. Media playback in standard definition was good, though 720 HD resolution content was hit or miss, with some juddery moments, and 1080 unwatchable.

Finally, the performance of the Eee Box could also be moot. ASUS is selling the Eee Box as a solution for specific tasks: to quote the press release, it's "designed for prolific emailers, avid web surfers and dedicated Voice over IP (VoIP) users". The Eee Box is adequately capable of managing those tasks, and there's no wild claims of it being the be all and end all of desktop computing.

We're torn on this one. It's slow but it's also inexpensive, works as advertised and looks good to boot. Would I buy one? No. But I'm not who they're targeting with this product. If you require a drop-in solution for a basic internet and work machine for someone who isn't going to want to do more than that, then it's spot on.

Notes for Australian buyers: the Eee Box is currently only available in black. Eee Boxes currently shipping into the PC channel do not include wireless keyboards and mice. Eee Boxes that will be sold via retail outlets will have a keyboard and mouse included. Retail sales will begin around mid-September.

Nick Race



Ask yourself first, what do you need it for? (Then you'll know if the Eee Box will be up to scratch.)



BenQ Joybook R45

Brilliant display, but a few ragged edges.

- CONTACT BenQ
- ONLINE www.benq.com.au
- MARKET Everyone
- PRICE $1,299

✔ Performance; HDMI port; vibrant display.

✖ Battery; no 802.11n; hard drive; keyboard.

7/10

Style isn't something you see a lot of at the value end of the market, but the Joybook R45 puts in a decent effort for the money. Emulating the look of a leather-bound portfolio, its lid is covered in a brown faux-leather material that's classy without being over-the-top. There are also nice touches inside, like an aluminium button panel, glowing orange outlines around the power and wireless buttons, and a decorative red stripe above the keyboard. It looks better closed than it does open, though — the silver paint around the keyboard and wrist-rest area clashes with the rest of the colour scheme and cheapens the overall look.

Included features are impressive at this price point. Sitting in the engine room is a 2.1GHz Intel Core 2 Duo T8100 processor, 1GB of DDR2 667MHz RAM (expandable to 4GB), 160GB 5,400rpm hard drive and Nvidia GeForce 8400M G graphics with 128MB of memory. This pulled in a solid performance in PCMark05 with a score of 4,595, making the R45 a great machine for general productivity tasks. 3D graphics are slightly better than what you'd get with an integrated chip, but the score of 1,094 in 3DMark06 means it's not up to the task for any graphically intensive games.

As a day-to-day machine, the R45 comes well-equipped, with a large 14.1in display and full-sized keyboard. The screen has a 1,280 x 800-pixel resolution that's easy on the eyes, and the 'Display Brilliance Enhancement Film' coating doesn't reflect glare excessively like other glossy screens. The keyboard is comfortable to type on for the most part, but the larger keys like Enter, Caps Lock and the space bar are rattly and make a lot of noise when you press them. Another gripe is the mouse buttons: BenQ has opted for a single button that's split in two underneath for left and right mouse clicks, and both sides are too stiff to use comfortably.

The R45 doesn't skimp when it comes to connectivity: the left side houses HDMI and two USB 2.0 ports, as well as a four-in-one memory card reader and ExpressCard slot, the right side features headphone and microphone jacks, FireWire, DVD SuperMulti drive and two USB ports, and the rear rounds it out with VGA, Gigabit Ethernet and modem ports. As for wireless, the R45 is behind the curve with support for 802.11b/g Wi-Fi only. Other features include Bluetooth 2.0 + EDR, a two-megapixel webcam and an integrated microphone for VoIP calls.

Entry-level notebooks usually ship with either the bare minimum of extra applications or crammed with bloatware, but the JoyBook R45 sits happily between the two extremes. ArcSoft WebCam Companion 2 and ArcSoft Magic i-Visual Effects are preloaded for use with the webcam, CyberLink Power2Go and CyberLink PowerDVD are on-board for playing and burning DVDs, and there are time-limited trials of Microsoft Office 2007 and Trend Micro AntiVirus 2007. BenQ also throws in Q-MediaBar2, but its name is misleading; rather than function as a multimedia front-end, it's simply a launcher that sits on the desktop with a carousel of 3D shortcuts for apps including Internet Explorer, email, WebCam Companion and PowerDVD — a function that's better-served by simply putting shortcuts on the desktop.

The R45 ships with a 4,800mAh 6-cell battery that sits flush with the bottom but extends slightly out from the rear. Using our DVD rundown test, with all power-saving and wireless features off and screen set to 40 per cent brightness, the notebook ran for one hour and 45 minutes before shutting down, which is short even by entry-level notebook standards. For regular use without Wi-Fi switched on, this could probably be extended to around three hours.

Jenneth Orantia



Look but *do* touch: HP's latest changes the game.

Editor's Choice

HP Touchsmart IQ500

Stifle your laughter — this all-in-one PC is much more than just an iMac clone.

CONTACT HP
ONLINE www.hp.com.au
MARKET Everyone
PRICE $1,999

✔ Touchscreen; features.
✖ Poor speed.

9/10

You might think the life of a hardware reviewer is one of playboy bunnies, private jets and suitcases stuffed full of cash, but the reality is a little more mundane. Think of a slightly overweight guy sitting in the dark, benchmarking a piece of hardware that is barely distinguishable from the next and you'll have a more realistic version. So when something as unique, not to mention down-right enjoyable, as the HP TouchSmart IQ500 Series PC comes along, you really can't blame us for turning into gushing fanboys.

It's easy to look at the Touchsmart and dismiss it as an iMac wannabe, but you'd be missing the point. That point is the tip of your pointer finger; the beauty of the Touchsmart is the fact that all 22 inches of its screen are touch-sensitive. The touch recognition is pretty accurate as well, allowing us to navigate My Computer without accidentally formatting the hard drive. Occasionally we'd hit the wrong program when playing with the start menu, but after a little practice even this cluttered area became perfectly controllable with our delighted digits.

Not that you'll be using the Vista interface much. If all you want to do is write basic notes, surf the net, watch TV, play music and browse your happy snaps, you'll probably utilise the custom HP interface instead. It shares some similarities with Vista's Media Centre (which is also part of the software install), using an icon based approach that is easy to see from a long distance. This makes it perfect for use from the couch, but you won't need Inspector Gadget arms to do so — the Touchsmart comes with a media remote. If you're up nice and close, the real benefit of the custom HP interface becomes apparent, being built with touch control in mind. It shares many of the same features as the iPod touch, such as gesture-controlled zooming and rapid scrolling. Considering HP is a PC manufacturer and not an operating system creator, it's done an admirable job with this custom interface. Combine this fantastic GUI with the accurate touchscreen and the result is a truly revolutionary computing experience that isn't just a bullet point in a PowerPoint presentation. It's ready to buy right now. As this reviewer can attest, there are people out there who didn't grow up with a mouse and keyboard (his parents being a golden-grey example), and using gestures to control the computer might be just what they need to get past their lack of experience. Hey — it worked for Nintendo's Wii, so there's a good chance it'll work for the Touchsmart.

To review this PC based on specs alone wouldn't be fair, but surprisingly enough, it stacks up pretty well. The 22in monitor is 1,680 x 1,050 resolution; not quite true HD, but crisp enough to make your DVDs look great. It's got a glossy finish, which opens up glare issues but helps reject oily fingerprints as best it can. The inbuilt speakers won't be shaking the foundations of your abode but for standard TV viewing they're more than adequate.

Speaking of which, the TV tuner in our model was standard definition rather than true HD, but unless you're a Blu-ray fiend you probably won't notice the difference. All 4GB of memory is actually used, thanks to HP's choice of 64-bit Vista, while the 2.16GHz Core 2 Duo chip provided plenty of oomph for day-to-day needs. It also does it at a temperature cool enough for the PC to remain whisper-quiet. The only area that is lacking is the video processor, utilising the Nvidia GeForce 9300M GS chipset. Gamers beware.

All up, we're big fans of the Touchsmart. It's a great all-rounder, whose unique interface is as much fun to use as it is worthwhile. Two thumbs up.

Bennett Ring

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TPG

ASUS P5Q Deluxe

Leaves the budget boards for dead.

CONTACT ASUS
ONLINE www.asus.com.au
MARKET Everyone
PRICE $258

✔ Features-packed; great overclocking.
✖ Doesn't come with a suitcase of cash!

9/10

PC scrooges rejoiced when Intel released its mid-range P965 chipset. It was basically the P975 in beggar's clothing, offering most of the goodies at a fraction of the cost: excellent overclocking headroom, tight memory timings and a feature set unheard of at its wife-pleasing price. When we heard Intel was releasing a new mid-range chip, the P45 Express, we were very keen to see if it lived up to its predecessor. The first P45 baby has now been delivered by the ASUS crane, in the form of the P5Q Deluxe.

Obviously, the big new feature of the P5Q is the Intel P45 Express chipset at its core. This includes a new ICH10R southbridge, which appears to be a die-shrunk ICH9R, offering identical functionality. The northbridge supports PCI Express 2.0, with 16 lanes up for grabs. ATI's CrossFire technology is supported, but SLI users are still out of luck. The board has a total of three PCI Express x16 slots (though only two are PCI Express 2.0, with the third being 1.1), two PCI Express x1 slots and two old-school PCI slots.

Dual Gigabit Ethernet ports are included, and ASUS has even gone the extra mile with the included 802.11n Wi-Fi. The new Analog Devices AD2000B chip takes care of the onboard audio processing, a solid sound chipset that surprisingly lacks DTS support.

ASUS has made a big deal about its EPU-6 engine, which uses automatic phase switching to lower the board's 16-phase power used by the CPU, chipset, video card, fan, HDD and memory. While we're not equipped to test ASUS's claims of power reduction, we've seen results that suggest this is one of the most power-efficient units on the market.

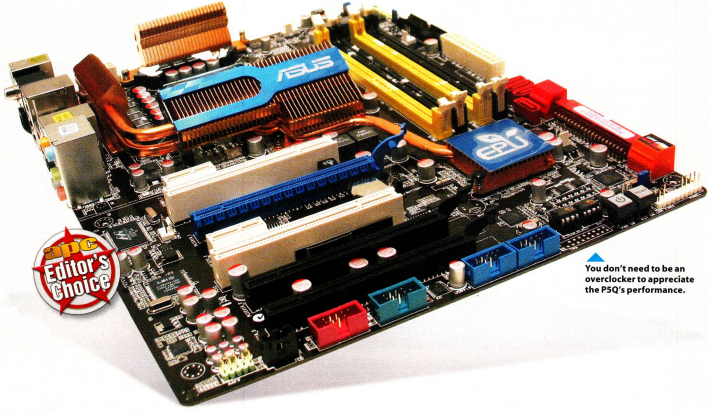
A passive cooling system removes heat from the capacitors around the CPU, northbridge, southbridge and, courtesy of a special adaptor, even the memory. It's a new design from ASUS, and based on our overclocking results, actually works. Speaking of which, based on the P965's excellent overclocking abilities, we were expecting great things out of the P45 Express chipset. We weren't disappointed.

This is the last motherboard chipset from Intel to offer a frontside bus (the Nehalem CPU has the memory controller embedded in the CPU, thus removing the need for a frontside bus), and in this motherboard the maximum official speed is 1,600MHz. However, we managed to extract a maximum frontside bus speed of a whopping 2,000MHz. It wasn't quite as solid as Venus William's thighs at this speed, but dropping it back to around 1,900MHz gave us 100 per cent reliability. We didn't even need to install the optional chipset fan on the board, as it was happy to purr away at this blistering speed, without incurring blistering temperatures. Pair this up with a vast array of BIOS tweaking options and you have a board that is an overclocker's delight.

You needn't be an overclocker to appreciate the performance though. As expected, the Intel heritage shines through with exceptional memory performance, and even with everything set at default it's one of the fastest Core 2 Duo boards on the market.

It looks like ASUS is on to a winner with the P5Q Deluxe, but there's one area we haven't mentioned yet — the price. Given how great the rest of the board is, is it any surprise that the price is also fantastic? Shop around and you'll be able to pick it up for less than $250. It might not be quite as affordable as the budget boards you can find, but it offers performance and features that leave them choking in its dust.

Bennett Ring



You don't need to be an overclocker to appreciate the P5Q's performance.



GA-EP45T-EXTREME

Offering serious performance, cooling and features, but can you afford everything else?

It's not often that a board arrives in the APC Lab which requires two of the staff members to lift it: just kidding, but the copper cooling mounted on the Gigabyte GA-EP45T EXTREME *is* serious machinery. It's a complex cooling solution, with a variety of pipes connected to major copper heatsinks around the Intel P45 northbridge, Intel ICH10R southbridge, as well as the MOSFETs around the CPU socket.

If you're like Maverick, you'll appreciate the ability to plug the impressive copper cooling solution into your watercooling kit — it's ready to be jacked in and watered down right out of the box. If you're like us and a little bit on the Goose side, you'll opt to use the massive air-cooled radiator instead. It's about the size of a small video card and knocks out one of the PCI Express x1 slots. Considering there are plenty of slots, that probably won't be an issue.

There's a total of three full-length PCI Express 2.0 slots, one running at 16x, one at 8x and one at 4x. If you've got a couple of ATI cards gathering dust, get ready to brush them off to make use of this board's CrossFire support, while there's a final PCI Express x1 slot just in case you've got one of the three PCI Express x1 components on the planet. Three trusty old PCI slots round out the board's slots.

In case you hadn't guessed, this board is designed with overclocking in mind, but the fun doesn't stop with the insane cooling solution. Oh no, there's plenty more fun to be had thanks to the dozens of miniature LEDs that tell you the voltage of the memory and CPU, just in case you can't be bothered diving into the BIOS.

We stayed away from memory overclocking on this board, as we didn't have the necessary DDR3 modules to test this, but we did have a field day with the CPU overclocking. We ended up with a tidy 470MHz frontside bus, nothing to be sneezed at. But even when running at default speeds, thanks to the speedy P45 northbridge and ICH10R southbridge, this is a blazingly fast motherboard. You'll just need to spend a few thousand on equally impressive components to get the most out of it — including the aforementioned DDR3 memory.

Even though we didn't test every single nook and cranny of this board, we've seen enough to proclaim this one of the most thorough and capable Intel-compatible boards on the market, with two major caveats. Firstly, it uses DDR3 — which is a major disadvantage if you ask us. Secondly, it supports CrossFire and not SLI, which comes down to personal choice. If you're an overclocker, whether or not you opt for the GA-EP45T-EXTREME will probably come down to your opinion on these two areas.

Bennett Ring

CONTACT	Gigabyte
ONLINE	www.gigabyte.com.au
MARKET	Performance enthusiast
PRICE	$359

✔ Amazing cooling solution; feature-packed; rock solid northbridge and southbridge.

✖ Damn you, DDR3; some of the BIOS options could be better explained.

9/10

HOT PC!



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GA-MA790GP-DS4H

Gigabyte is the first to market with an AMD 790GX-powered motherboard.

AMD's recent 780G chipset finally gave cheapskate gamers an integrated graphics solution capable of running more than just Solitaire. World of Warcraft, Half-Life 2 and even Call of Duty 4 are all playable at medium resolutions on this chipset, thanks to the Radeon HD 3200 that pulses at the heart of AMD's impressive chipset. So how could AMD improve on this already imposing chipset? The answer is the 790GX, which has four main, new features that make it an even more capable PC backbone. Gigabyte is the first company to hit the *APC* Labs with a 790GX-powered beastie, in the form of the GA-MA790GP-DS4H.

If you've got a stash of liquid nitrogen in the freezer for world record overclocking attempts, you'll probably know all about AMD's Advanced Clock Calibration (ACC) feature. Unfortunately, AMD won't spill the beans on how it works. All we know is that it's meant to provide a measurable increase in the overclock of any given chip when compared to a non-ACC board.

It's easy enough to enable — just hit Ctrl+F1 to view the advanced BIOS options and voila, there it is. There's the option to enable ACC on each individual core, as well as a percentage value. Given that it's one of the board's biggest differentiators, we have to question why it's not mentioned in the manual, or on the Gigabyte web site.

CONTACT	Gigabyte
ONLINE	www.gigabyte.com.au
MARKET	Performance enthusiast
PRICE	$199

✔ Fastest integrated graphics; RAID 5.

✖ Twice the price of other similar 780G boards.

7/10

Such an oversight is inexcusable. Due to this, we have no idea what the difference is between two and 12 per cent ACC, but after a little online research we discovered that AMD recommends between four and six per cent. We found no difference in our overclock between the two, with both settings giving our X2 6000+ an extra 150MHz over previous overclocks. Not too shabby, but given that the total overclock was still only 15 per cent over stock speed, it's not enough to leapfrog AMD's chips into the number one spot for tweakers.

The other major area to receive attention is the integrated Radeon HD 3200. It's now 200MHz faster. It also has its own 128MB of onboard DDR3-1333 memory. This onboard memory should show up in all 790GX mobos, but it's up to the manufacturer to implement. The 3300 can be used in a hybrid configuration with a single discrete video card, while the third major addition to the board is CrossFire support. Two 8x PCI Express lanes are ready and waiting for your ATI cards, but if you plan to use the board's CrossFire capabilities, the onboard 3300 chip will lay idle.

Nvidia's implementation of a similar technology, in comparison, allows its integrated graphics to still be used, even in SLI systems.

The final major addition comes courtesy of the SB750 southbridge. Answering the same functionality in the GeForce 8300 chipset, this southbridge now offers RAID 5 array support. While we couldn't test AMD's claims, apparently its performance in this regard beats Intel's ICH10R when used with three drives, but not with four.

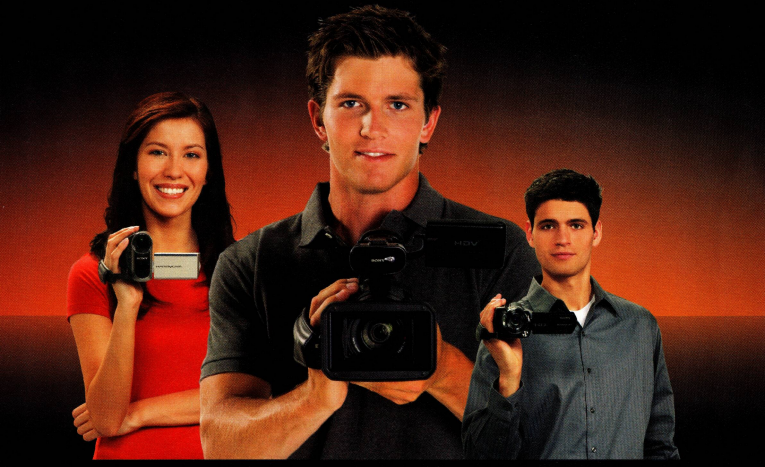
So then, this Gigabyte board offers better overclocking, faster integrated graphics, CrossFire and RAID 5 support. Performance in our PC Mark Vantage shows that it's one of the quickest AMD chipsets available, though our overclock results also show that ACC isn't quite the saviour for AMD tweaking that many hoped it would be. The only issue we can see is the price point — it's much more expensive than Gigabyte's 780G-powered motherboard, the similarly outfitted GA-MA78GM-S2H, which retails for $99. Compared to the GA-MA790GP-DS4H — at $199 — you get CrossFire support, a slightly faster graphics core, RAID 5 and ACC. Unless those features are worth an extra hundred bucks to you, we reckon the 780G-powered version will suit your needs just as well.

Bennett Ring



790GX power, but do you need the features badly enough at this price?

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Palit 9800 GT Sonic 512MB

The $200 graphics card market continues to heat up.

While Nvidia has come up with a new naming scheme for its top-end cards, it seems that it's determined to continue using the 9 series naming scheme for others. This month we see not only one new card enter the 9 series, but two. The 9800 GT is designed to come in below the 9800 GTX+ but stay ahead of the more mid-range orientated 9600 GT.

Based on the G92 core, the new 9800 GT is really nothing more than an old 8800 GT. It operates with the same core clock of 600MHz, shader clock of 1,500MHz and the 512MB of GDDR3 memory coming in at 1,800MHz DDR. Also, like the 8800 GT, we have a 256-bit memory interface and 112 processor cores.

The card we're looking at today, however, is the Sonic version from Palit, which means that, out of the box, it's overclocked. The core gets a nice little bump to 650MHz while the shader goes to 1,625MHz and the memory goes to 1,900MHz DDR. The card also uses a dual-slot cooler to keep the temperature and noise down compared to the stock cooling solution.

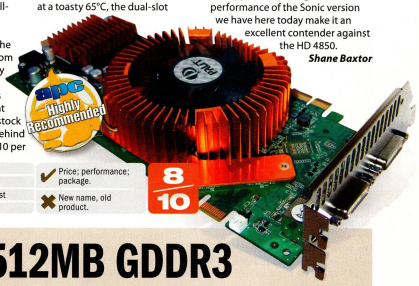
Included is a driver CD, manual, Molex to PCI Express connector and DVI to VGA connector and a full-version copy of Tomb Raider: Anniversary Edition.

The main competition for the new 9800 GT is the HD 4850 from ATI, which comes in at a slightly higher price tag but has quickly become well known as a card that represents excellent value for money. As far as the stock 9800 GT goes, the card trails behind the HD 4850 by an average of 10 per cent across most games and resolutions. The Palit overclock manages to bring the performance up to the HD 4850.

One of the biggest advantages the 9800 GT has over the HD 4850 is the temperature. While the single-slot HD 4850 cooler keeps the core at a toasty 65°C, the dual-slot solution on the 9800 GT Sonic is a much more reasonable 50°C. Power draw is also very similar, with less than 10W separating the HD 4850 and Palit 9800 GT at idle and load.

While the 9800 GT might be nothing more than an 8800 GT, the aggressive pricing and performance of the Sonic version we have here today make it an excellent contender against the HD 4850.

Shane Baxtor



- CONTACT Palit
- ONLINE www.palit.biz
- MARKET Performance enthusiast
- PRICE $199

✔ Price; performance; package.

✖ New name, old product.

8/10

Leadtek 9500 GT 512MB GDDR3

Nvidia caters for the user looking to get away from onboard graphics.

Over the past few months, every graphics card that's been released has been focused on the gamer. It seemed that both Nvidia and AMD had forgotten about those people who only want to do a little bit of light gaming while spending as little as possible. That's all just changed, however, with the release of the new 9500 GT from Nvidia, which brings a new graphics card to a low $100-or-under price bracket.

The 9500 GT has launched in two versions; the first is a cheaper GDDR2 model which starts at around the $70 mark and the other is a slightly more expensive GDDR3 model that starts at around the $90 mark. Today we have with us the latter version from Leadtek which sports 512MB of GDDR3 memory.

While both the GDDR2 and GDDR3 models come with the same 550MHz core, the memory clocks on both are different. The cheaper GDDR2 model comes in at quite a low 1,000MHz DDR memory clock while the pricier GDDR3 model comes with a much more respectable 1,600MHz DDR. Other specs include 314 million transistors, 32 stream processors, 8 ROPs and 16 texture filters to make up the rest of the card.

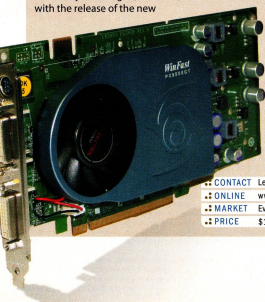
Most companies are offering active and passive-cooled cards, though the particular Leadtek model we're looking at today comes with a single-slot cooler that has quite a large fan on it to keep the card as cool as possible. With the help of the active-cooling solution, they have pushed the card up 25MHz on the core making it 575MHz which should aid in giving us a bit more performance.

Inside the box there isn't a whole lot going on due to the card being in the lower end segment of the market. Apart from the manual and driver CD we also have a component/S-Video out dongle and a single DVI to VGA connector.

Looking at the performance side of things, you would expect a bit more for a card of this price. Performance sits at about half the speed of the 9600 GSO which costs roughly 50 per cent more, making the GDDR3 version of the 9500 GT pretty poor value. And while you could do a bit of light gaming at lower resolutions like 1,280 x 1,024 or 1,024 x 768, we'd recommend that you save the extra $50 or so dollars to make the jump to a 9600 GSO, which, when overclocked, offers almost identical performance to the 9600 GT.

All up, the 9500 GT really is a bit too expensive for what it is. The 9600 GSO/GT offer better value.

Shane Baxtor



- CONTACT Leadtek
- ONLINE www.leadtek.com
- MARKET Everyone
- PRICE $125

✔ Cheap; single slot cooling.

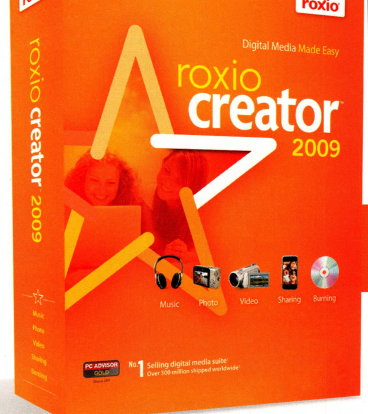
✖ Poor performance; small bundle.

6/10

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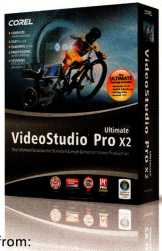


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CONTACT Sapphire
ONLINE www.sapphiretech.com
MARKET Performance enthusiast
PRICE $699

✔ Performance.

✖ CrossFire X still has issues.

8/10

Sapphire HD 4870 X2

AMD plans to take back the No. 1 spot in the graphics card market.

Nvidia is yet to talk about releasing another dual-GPU card to replace the 9800 GX2, but from the word go AMD has said that the HD 4870 X2 was coming, which is great for people who want to get into the dual-GPU scene but don't have a compatible motherboard.

Like the HD 3870 X2, the new model is really two of AMD's highest-end single GPU graphics cards moulded onto a single PCB. Stream processors are 800 x 2, texture units come in at 40 x 2 and ROPs are 16 x 2. The memory bus for the card is 256-bit x2 along with the transistor count being 956 million x 2. The two cores run on the same 55nm technology seen in the HD 4870.

Like the HD 4870, our two cores both come in at 750MHz each, while the two lots of 1GB GDDR5 come clocked at the same 900MHz (3,600MHz Data Rate). Unlike the HD 3870 X2, which had its clocks slightly dropped when compared to the reference HD 3870, AMD has kept the same clocks for both the X2 variant and the single-core version this time around.

Powering the card are two connectors, just like the standard HD 4870. What differs, though, is instead of a dual 6-pin connector configuration, AMD has opted for the single 8-pin connector and single 6-pin connector setup which has become more common with the higher-end cards such as the GTX 280 from Nvidia.

Inside the box, Sapphire has included the standard driver CD and manual. Also inside we have Ruby ROM Volume 1, CyberLink's DVD Suite and PowerDVD along with an Advanced Edition version of 3DMark Vantage with a key provided. The cable department is pretty standard with two power convertors, component-out dongle, S-Video to RCA connector, CrossFire bridge, DVI to VGA connector and DVI to HDMI connector.

Sliding the single card into our test system and firing some of our benchmarks up, what we generally found was a card that performed slightly better than a pair of HD 4870s. This is thanks to the decreased latency between the two chips talking to each other as a CrossFire bridge is not needed. The results for the card are very consistent with it always beating out the HD 4870 CrossFire setup in games like UT3 and Crysis.

With a second card in hand, it was time to test what four GPUs were capable of. Firing up Vantage greeted us with an error and 3DMark06 was also a bit unstable at times. The games it did pass like Crysis, UT3 and World in Conflict didn't see any real gains with the additional card. An extra fps or two here and there, but that was it.

With that said, we're still running on very early drivers and AMD has really begun to work on improving CrossFire performance with upcoming drivers. For the most part, the HD 4870 X2 is also faster than the GTX 280, which does make it the fastest single card on the market at the moment.

The HD 4870 X2 will be a great-selling product thanks to the popularity AMD has gained in its graphics card division over the past few months. People who bought P35 or P45 motherboards, which don't support dual x16 slots (rather, a x16/x4 configuration) will be glad to know they can have the same CrossFire performance as someone with a more expensive X38 or X48 motherboard — which does carry dual x16 slots.

The problem with dual GPU cards at launch has always been driver optimisation when adding more than a single card into the mix. The HD 4870 X2 this time around is really no different, with the same instability issues seen in a CrossFire X setup. With that said, if you're looking for the fastest single graphics card on the market to sit in your P45-based motherboard that overclocks well, the HD 4870 X2 is an excellent choice. The main thing you have to really remember about this kind of graphics card is, in so many games, you become CPU-limited. While 3GHz does seem like a lot, at this speed you're still not really letting the card show its full potential. Grabbing an E8600 and raising the FSB to 400MHz to give you a 4GHz stock clock yields big gains in a number of games. For now, we would probably try and avoid a CrossFire X HD 4870 X2 setup due to the driver support. But if you're looking for a single card that performs extremely well, you really can't go past the HD 4870 X2.

Shane Baxter

Thermaltake ToughPower 1500 Watt PSU

Can you ever have too much power? We test the TT ToughPower PSU to find out.

When the 1000-watt power supply came out only recently, people really did think that it was more power than they'd ever use. The main problem with power supplies, though, is that not all are created equal. So why do two power supplies with exactly the same wattage cost two completely different prices?

Over the last few months we've seen 1000-watt power supplies fall to the new GTX 280 from Nvidia when running in SLI or Tri SLI mode. Thermaltake are here to the rescue, however, with the release of a whopping 1.5KW unit that is designed to keep up with the latest and greatest graphics card releases.

Specifications-wise, the Thermaltake 1500-watt unit looks impressive. With a total of 100 amps split across four 12V rails, you really do have plenty of power sitting there just waiting to go. Apart from the +12V lines, the +3.3V and +5V lines come in at 30 amps each. The whole setup behind the unit is like having two 750-watt power supplies moulded into a single chassis. Along with the high amperage on hand, we have a huge amount of connectivity as well. There's four 6-pin and four 8-pin PCI Express connectors, eight SATA and eight molex connectors, two floppy connectors and the standard 24-pin and two 8-pin CPU connectors.

The unit is cooled by a 140mm fan that runs between 1,300 and 2,300rpm, outputting 16dBA at its lowest speed. The larger fan in combination with the huge amount of wattage on offer means that the power supply is longer than some of your standard 800-watt and below models. While the most common size for a power supply is around the 140mm mark, like most 1000-watt units, the Thermaltake power supply comes in at a longer 200mm. While for the most part this isn't a problem, if you have a unit that does have a fan that runs across the top of your case, it may have to be removed so the unit can be installed properly.

While the expensive cost associated with the 1500-watt Thermaltake power supply may seem hard to swallow for many, if you're a regular buyer of $500 graphics cards or $1,000 processors then you'll understand the importance of a quality power supply.

For die-hard performance enthusiasts looking to buy a new power supply to power that CrossFire HD 4870 X2 system that you will probably upgrade again soon, we would highly recommend you consider a high-performance-wattage power supply like the 1500-watt unit we have here. It ran our HD 4870 X2 cards in CrossFire on our overclocked quad-core system without missing a single beat.

Shane Baxtor



CONTACT	Thermaltake
ONLINE	www.thermaltake.com.au
MARKET	Performance enthusiast
PRICE	$519

✔ Excellent connectivity; plenty of power.

✖ Expensive; large.

8/10

Thermaltake M9D

With its colourful LED display, this is one of the most eye-catching chassis out there.

Straight out of the box, the M9D has got Thermaltake written all over it. At first glance, you'll notice a door that looks like it belongs on an alien aircraft and a big side window that carries with it a 23cm fan that manages to glow in blue, red, green or mixed thanks to a button at the bottom of the window. However, if the side panel is too much for you, Thermaltake offers the M9D with a simple black side with room for a single 8cm fan.



Looking head on, the left side of the door has a power and reset switch, while the right has two USB 2.0 ports, audio in and out, along with an eSATA port. Opening the door up, we find nine 5.25in drive bays and a single 120mm fan that helps draw air into the case, thanks to the mesh design.

With the side panel off, we see the typical tool-free design that you find in most cases these days. Another 120mm fan also helps draw hot air away from the CPU and exhausts it out the back.

At the bottom of the case we have a 3.5in HDD cage that takes up three 5.25in bays and holds three hard drives. Attached to the cage is a single 120mm fan that blows cool air directly across your hard drives to make sure that they stay as cool as possible. Installation is a breeze, with the midi tower giving us plenty of room to install those long graphics cards and an ATX motherboard. Due to the cage design for the hard drives, you will need to use screws. Luckily, it only takes a minute to screw a few hard drives in. All the normal cables are there along with a SATA one that plugs right into your motherboard.

The Thermaltake M9D stands at just under 45cm tall and its all-steel body weight is a reasonable 7.1kg. The LED scheme they've chosen to go for isn't as over-the-top as some of their other models, which means that if you like a little colour but don't want to be blinded by it, the M9D is a good choice.

The cooling ability and overall design of the case is impressive, and the price tag is pretty standard. We've noticed, though, that some companies do offer a small 430-watt PSU for a similar price to the RRP. Looks are always subjective, but with some nice glows, a huge amount of airflow and an easy setup, it's definitely worth a look.

Shane Baxtor

CONTACT	Thermaltake
ONLINE	www.thermaltake.com.au
MARKET	Performance enthusiast
PRICE	$139

✔ Good weight; decent price; plenty of colour.

✖ 3.5in drives require tools.

8/10

Patriot 4GB DDR3 Kit

Looking for a bit of extra speed?

With higher speeds, lower latencies and more production than ever, we're now able to get into DDR3 memory at a reasonable price as its popularity grows. In fact, prices have become so good that for the ultra-enthusiasts who do have slightly deeper pockets, 4GB and 8GB configurations are not out of the question anymore.

While Patriot offer a wide range of speeds and latencies, the kit we're looking at today carries with it a default speed of 1,333MHz. The timings on it are 7-7-7-20 and the default voltage is 1.7V. While timings of 7-7-7-20 might not seem all that impressive for high-end DDR2 users, compared to an entry level 1,333MHz kit at 9-9-9-24, the lower latency gives us a slightly better access time while having to only spend slightly more.

The kit we have consists of two modules; each module comes in at 2GB giving us a grand total of 4GB. With the pricing being so good these days, we took the time to add another kit into the mix. So, with four modules in hand, we have 8GB of memory. While this may sound excessive to most, if you're big on multi-tasking then the extra speed that the 8GB offers is handy. In applications like Photoshop and Illustrator, we don't have any slow-down issues when switching between apps or just rendering, opening or modifying images.

With that said, the same performance gains aren't seen everywhere. If you're a gamer, the extra 4GB of memory offers very little in the way of decreased load times. Your best bet would be to simply buy a 4GB kit and then use the money saved for a faster graphics card.

The one thing that's worth noting is that if you do want to venture up to 4GB of memory or more, you will have to be running a 64-bit operating system. If you are using a 32-bit OS, Windows will only address up to 3.25GB.

A 4GB kit of high-speed DDR2 will set you back above $250. For an extra $100 you can find yourself with a slightly faster set of DDR3 modules which are going to be ready for Nehalem, come quarter four of this year.

Patriot has done a good job of offering us some low latencies at 1,333MHz for the mid $300 mark, making DDR3 a good option for people who want to keep up with today's technology.

Shane Baxtor



- CONTACT Patriot
- ONLINE www.patriotmemory.com
- MARKET Performance enthusiast
- PRICE $350

✔ Reasonably priced; good performance.

✖ Still double the price of entry-level DDR2.

8/10

Noctua NH-U12P CPU cooler

How cool is a cooler when it's strapped to an overclocked Q6600 at 3GHz?

While Noctua has been around for a while, we've only recently seen it show up in the local market. Mainly known for its heatsinks, it also has a line of fans along with other cooling accessories, including its own thermal paste and chipset coolers for your motherboard, giving you a number of cooling solutions for your computer.

The product we're looking at today is the NH-U12P cooler, which uses a tower design and sits quite tall at 158mm. Implemented into the cooler are a number of cooling technologies such as dual heat pipes, the award winning NH-U design that helps give excellent airflow direction, and one of Noctua's premium 120mm fans; the NF-P12. Noctua also includes another set of brackets in the box so you can add a second fan with ease.



Out of the box the NH-U12P supports all current processors on the market, including the LGA775 design from Intel and the AM2 and AM2+ sockets from AMD. While there are a number of aluminium fins running up the tower, both the base of the heatsink and the heat pipes that run up the centre of the cooler are made of copper to help heat extraction.

The fan spins between 900rpm and 1,300rpm, putting out a very peaceful noise level as low as 12.6dBA and as high as 19.8dBA. This makes it really whisper-quiet, and it's something you actually notice — or don't notice, rather — when you turn your system on for the first time.

However, what really matters when it comes to CPU coolers is performance. Fortunately the U12P isn't just a bunch of marketing talk. Throwing it onto our testbed gave us some pretty impressive results. Idle temps for our Q6600 at 3GHz came in at 27c/30c/26c/22c, while firing up World in Conflict and running a few loops of the benchmark brings temps up to 41c/45c/44c/40c — this is still very reasonable indeed.

While the noise levels are above the 19.8dBA rating Noctua gives us, this is mainly due to the graphics card, which runs at a much louder 50dBA. You'll really notice the quiet though when you're sitting there typing away in Word or cruising the internet.

The NH-U12P isn't a cheap cooler by any standards, but you get what you pay for: its excellent design and features make it well worth the money if you're happy to spend it. If you're looking for some active cooling that is going to be extremely quiet, it's an excellent choice.

Shane Baxtor

- CONTACT Noctua
- ONLINE www.noctua.at
- MARKET Performance enthusiast
- PRICE $98

✔ Excellent performance; good CPU support.

✖ Expensive.

9/10

AOC Rivio 22in TFT

Bright and shiny: an elegant appearance with great performance.

- CONTACT AOC
- ONLINE www.aocmonitor-anz.com
- MARKET Everyone
- PRICE $539

✔ Excellent colour; card reader.

✖ No height adjustment.

7/10

The AOC Rivio 2230Fm is a great-looking display. The gloss display is surrounded by a shiny black bezel with a single large button at the bottom of the screen. The button is surrounded by a multi-directional controller that's used to access and change the screen's various configuration options. The overall impression of this monitor's appearance is that it wouldn't look out of place on the desk in an ultra-modern office.

Plug-and-play installation worked well, with image quality being very good without the need to install any special drivers or software. There's connection support for VGA, DVI and HDMI and an in-built speaker making this a very flexible beast. Pressing the multi-directional controller's 'up' arrow let us easily toggle between different screen modes for reading text, browsing the web, gaming and watching movies. Image quality in each mode did vary, but given the wide variety of adjustment options it was easy to find a default setting we liked best.

As well as supporting devices connected by cable, the 2230Fm can also play back multimedia content directly from USB storage devices and memory cards, as it has an integrated Digital Media Player.

Getting the 2230Fm positioned comfortably on the desk will require the use of a stand for taller users as there's no height adjustment. However, there was good tilt range. The 2230Fm can't be rotated into a portrait orientation.

While not specific to the 2230Fm, it's worth giving some consideration to whether a glossy display is superior to a matte one. Certainly, there are as many people who think gloss is best as folk who prefer matte. Some design professionals suggest that glossy displays aren't as faithful to an image's true colours as matte. However, that's an open debate.

The glossy display on the 2230Fm did look great, but there were plenty of annoying reflections. Combined with the glossy bezel, this did get on our nerves initially but, eventually, we learned to shut it out and it stopped being a bother.

Putting the 2230Fm through its paces with PassMark's Monitor test showed that it's an excellent display. Ellipses and diagonals were rendered with no jaggies and colours didn't bleed into each other, with clear distinctions between adjacent colour blocks. Blacks were solid, with whites being bright with no hint of gray.

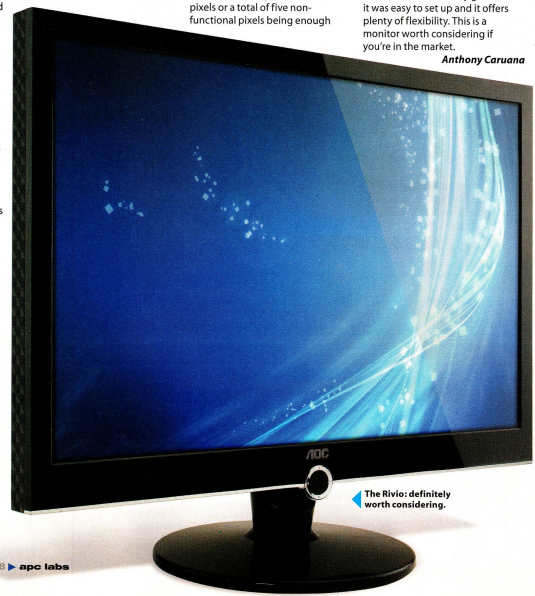
The 2230Fm's display is rated as having 2ms response times. Certainly, when watching movies with fast-moving actions sequences, there was no blurring and it was bright enough for shading to be clearly visible, even in scenes with low lighting.

We couldn't spot any dead or stuck pixels on our review unit. AOC's policy is very similar to HP's, with three stuck pixels, three dark pixels or a total of five non-functional pixels being enough for a replacement during the three-year warranty period.

As well as the A/V inputs, the 2230Fm acts as a USB hub, with the two ports conveniently placed on the left size of the display with the card reader. The reader supports SD, MMC, XD and Memory Stick. That's probably good enough for most digital camera users, now that CF is slowly phasing out of the consumer arena.

Other than the lack of height adjustment and landscape-only orientation, there's a lot to like about the AOC 2230Fm. Image quality, both in benchmarking and real-world use was very good, it was easy to set up and it offers plenty of flexibility. This is a monitor worth considering if you're in the market.

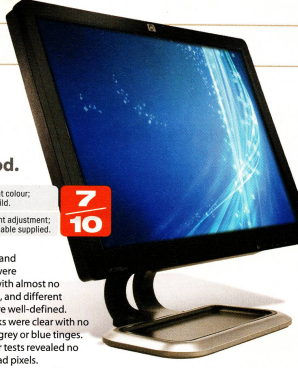
Anthony Caruana



The Rivio: definitely worth considering.

HP L1908wm LCD

It might be a little pricey, but it's pretty darn good.



Although for many folks a 19in screen is a little on the small side, they can be attractive to those who are on a tighter budget and don't need high-definition video output. The HP L1908wm LCD monitor slides into that market niche with a screen that delivers excellent colour, brightness and depth.

The L1908wm supports connections by VGA and DVI-D, and there's a 3.5mm socket for connecting the audio output from your PC to use the in-built speakers — ideal for desks where space is at a premium. The speakers won't replace a sophisticated surround system, but for an office PC they're good enough. There are no other video inputs, but both the DVI and VGA connectors can be used at the same time. This means you can use the screen with two systems and then toggle between them using the display's configuration tool.

CONTACT HP
ONLINE www.hp.com.au
MARKET Everyone
PRICE $399

✔ Excellent colour; solid build.

✖ No height adjustment; no DVI cable supplied.

7/10

HP only supplies a VGA cable with the display, which we found disappointing given that even bargain-basement LCDs ship with a DVI cable. It means users won't get the optimal experience out of the box without buying an extra cable.

Adjusting the L1908wm for optimal viewing requires a stand for taller users, as there's no height adjustment. However, the display does have a wide tilt range, and the screen has a matte finish that minimises reflections. The L1908wm only operates in landscape mode, as there's no way to rotate it to a portrait orientation.

We put the L1908wm through its paces with PassMark's Monitor Test using the supplied VGA cable.

Ellipses and diagonals were displayed with almost no jaggedness, and different colours were well-defined. White blocks were clear with no noticeable grey or blue tinges. Solid colour tests revealed no stuck or dead pixels.

Real-world testing of the L1908wm revealed a competent small office or home display. The 1,440 x 900 resolution was adequate for showing word documents and spreadsheets, with fonts displayed nicely. Photos looked excellent with colours displayed vibrantly. Viewing standard-definition DVDs was good, with excellent contrast between light and dark shades and action sequences clearly displaying fast-moving objects with no blurriness.

There's a lot to like about this display. Sure, the resolution is a little on the low side, but then most folk buying a 19in display wouldn't expect it to fulfil all their multimedia needs. On the other hand, it works well with DVD-quality video and displays documents nicely.

Anthony Caruana

HP L2245W Monitor

A solid build doesn't mask this display's less-than-stellar image quality.



Solid — that's the first word that sprang to mind as we took the HP L2245W display from its packaging. The large, flat stable base gives this screen a robust feel.

Installation was straightforward. The Display Assistant provides an easy way to adjust the screen's settings and installs an optimised monitor driver. We couldn't see any improvement using the HP driver over the generic one supplied.

The monitor is mounted on an arm that can rotate, pivot, raise and lower so it can accommodate almost any user on a standard office desk. However, getting the screen into a perfectly horizontal position was difficult, as it doesn't click into standard portrait orientation.

If you work a lot with documents and page layouts the ability to turn the display 90 degrees means you can display a full A4 page on this 22in panel at about 120 per cent of its full size.

Setting the L2245W up was reasonably straightforward, although we were annoyed that only a VGA cable was supplied with our review unit. It's possible to have two computers connected to the L2245W and toggle between systems. There are no other video connections, so it's a strictly computer-only screen.

As is common with many LCDs these days, the L2245W has a USB hub with two ports. While this is handy, the ports are a bit difficult to access so are really only useful for peripherals you wouldn't be connecting or disconnecting often.

Image quality too was a little disappointing. While ellipses are rendered with minimal jaggedness, some colours looked a little washed out and white blocks had a tinge of grey. Text rendered quite nicely and wasn't blurry or difficult to read.

CONTACT HP
ONLINE www.hp.com.au
MARKET Everyone
PRICE $599

✔ Highly adjustable; solid build.

✖ Image quality.

6/10

Testing monitors in the Labs is a good excuse to put on a favourite DVD to see what a screen is really capable of. Battle sequences with fast-moving objects worked nicely, although the maximum resolution of 1,680 x 1,050 means that the L2245W isn't capable of displaying full high-definition content. We also found the images were dark.

We see this screen as being firmly pitched at business users. The solid build, sensational adjustment range and size make it an excellent desktop monitor. The issues we saw with some colours bleeding and the difficulty in getting dark scenes to display clearly keep this from being the right screen for a multimedia or gaming set up.

If you're contemplating a new monitor for the office, the L2245W certainly offers plenty of flexibility, although we did find the graphics to be a little washed out.

Anthony Caruana

Western Digital My Book Mirror

Want a convenient way to keep your precious digital memories safe?

CONTACT Western Digital
ONLINE www.westerndigital.com.au
MARKET Everyone
PRICE $699

✔ Large capacity; stylish design.
✖ No FireWire.

9/10

It has never been quicker and easier to create enormous amounts of data. With the boom of digital cameras, people are creating thousands of megabytes a year in photos, and even that's increasing. With 7-megapixel digital cameras dropping below $200, the size of these digital memories has been going up too. Adding to that, people are taking more and more photos since it costs them nothing to do so!

While you might have taken 10 or 20 photos when you've gone out with the family for the day with a film camera, it's so easy to keep pressing that shutter button on your digicam, and before you know it you have a hundred or more images.

Sure, that means you will have captured every second of your day out, but now what? Most people will plug their camera into their PC, download the photos into a folder or image-organising application, wipe their memory card and start all over again. And herein lies a major flaw: what if your computer was to get a virus, or your hard drive was to fail? Those photos could be gone forever, no way to retrieve them. This is the area where most family's stumble when it comes to digital photography. They have no backup plan.

There are various ways to make sure your memories are safe, but the product we're looking at today is possibly the next best thing to having a negative of your digital photos. It's called the My Book Mirror Edition, a new drive from Western Digital that makes it very easy to keep multiple backups of your photos, videos, documents and other files, without any extra effort. Quite aptly named, the My Book Mirror Edition has a trick up its sleeve.

It's quite a chunky looking block, larger than most other external hard drives on the market, and there is a very good reason for that. Inside its glossy black plastic shell lies not one, but two 1TB hard drives, spinning in harmony, using RAID 1 to keep two copies of every byte of data you copy to it.

For those who don't know, RAID stands for Redundant Array of Independent Disks, meaning two or more hard drives are linked together for either increased storage and performance or backup purposes. RAID 0 (striped) and RAID 1 (mirrored) are the two most common RAID setups.

The My Book setup wizard allows you to choose between RAID 0 and RAID 1, and your choice will depend on your needs. Using RAID 0 can be risky, especially on a backup device, as in the event one of the drives fails, all the data shared between the two is lost.

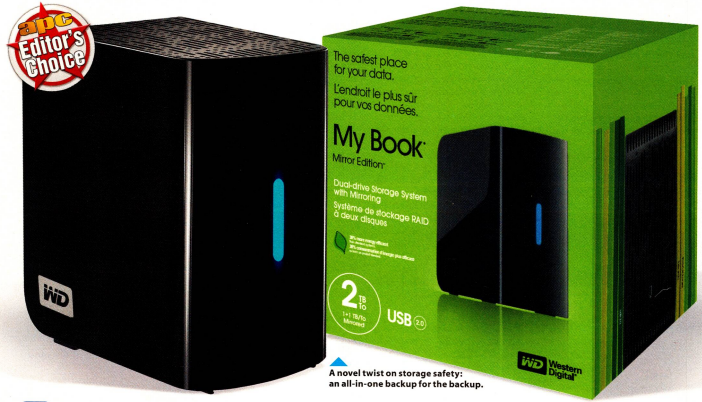
RAID 1 is the perfect setup for this unit, as not only will the My Book serve as a backup for your computer, but a backup for itself as well.

Included with the My Book Mirror Edition is Western Digital's 'WD Anywhere' backup software for both PC and Mac, allowing you to schedule automatic backups of selected files and folders. Being able to schedule your backups is vital, as it is easy to forget or put it off, with the thought that 'another day won't hurt'. WD Anywhere monitors the selected folders for changes and backs them up instantly in the background, without any user intervention.

Alternatively, Mac users could use Leopard's built-in Time Machine for automatic backups of their entire system. Unfortunately there is no FireWire port, so you'll have to stick to USB 2.0.

The Western Digital My Book Mirror Edition is the perfect backup solution for families who want to protect their precious memories, with the security of multiple backups, and the simplicity of performing just one.

Mitchell Oke



A novel twist on storage safety: an all-in-one backup for the backup.



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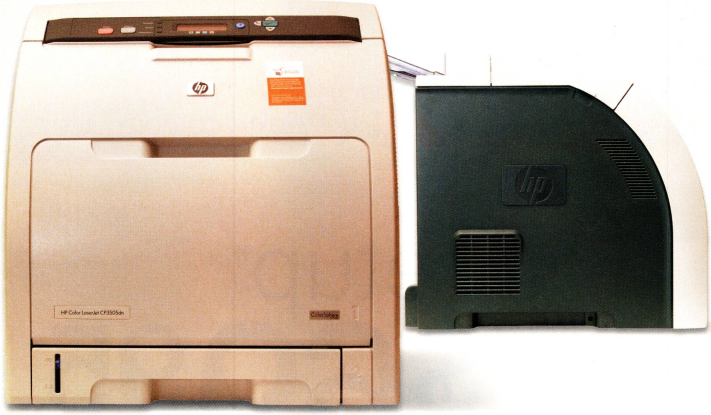
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HP CP3505dn

Traditional and reliable colour printing, but not the quietest on the market.

HP's CP3505dn is an A4 colour laser printer with USB 2.0 and 10/100 Ethernet interfaces. In keeping with the flavour of the times, a duplexer is fitted as standard, although the printer is also available in models without it or the network interface. It measures a fairly chunky 39 x 47 x 42cm (excluding paper catcher), and the styling is 'traditional business machine' rather than 'funky modern office'.

Installation would have been straightforward, but a couple of the instructions in the setup booklet did not match the reality. Fortunately, the colours of the toner cartridges are clearly marked inside the printer, so it was no big deal that the setup leaflet showed cyan and magenta transposed. Although the cartridges were preinstalled, it was necessary to remove them to release part of the packing materials. They are located behind the front flap, so changing cartridges is a quick, clean and easy process.

CONTACT	HP
ONLINE	www.hp.com.au
MARKET	SMB / Enterprise
PRICE	$2,299

✔ Quick 'first page out' time.

✖ Bulky; relatively noisy.

7/10

The other issue took a little more investigation, in that the menu structure that had to be navigated for network setup wasn't quite as shown in the manual. Not a major problem, but an unnecessary one, especially as the small two-line display is inconvenient to use at the best of times.

Drivers are provided for Windows 2000, XP and Vista (HP's universal driver), and Mac OS X 10.2 to 10.4 (it also worked on our 10.5 system). The printer supports PCL as well as PostScript (emulated). No software other than the necessary utilities is provided, which is par for the course with this category of printer.

The main documentation is provided on CD in Windows help and PDF format. We're fighting a lost battle on this, but the relative complexity means printed manuals would be very welcome.

The primary paper tray holds around 350 sheets and has an indicator to show how full it is. The front-mounted flap-down multipurpose tray is handy for envelopes and other special stationery but is obtrusive and ugly when open. An optional third tray can be fitted below the main unit to add another 500 sheets. The output tray holds a nominal 250 sheets.

HP claims a quick 'first page out' time for this model, and we were not disappointed. The first page of our test document emerged in just eight seconds, with the second arriving in another 5 seconds. Nominal speed is 'up to' 21 pages per minute, but we'll forgive the shortfall as most print jobs are only a few pages long, and getting the first one out quickly is often more important than peak speed.

The physical margins on an A4 page are between 2 and 3mm. All-black pages revealed an acceptable degree of leathergraining, but the evenness of tone left something to be desired. The graining was also noticeable in darker areas of photographs and business graphics, which were otherwise attractive and without excessive shine. Text was crisp and dark.

The CP3505dn is on the noisy side, so it's one of those printers best relegated to a corner of the office well away from anyone's desk. Apart from that, it would be an asset to a busy team that needs quick, good-quality colour output, especially if the extra paper tray was installed.

Stephen Withers

MSI

NOTEBOOK

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Sharp AQUOS LC-37D33X

Solid standard-definition performance keeps this Sharp HDTV in the running.

One of the biggest challenges of an HDTV isn't displaying high-definition content so much as upscaling standard-definition sources like DVDs, cable programming and free-to-air TV without it looking like a blurry mess. 720p sets have an easier time of it as there are less pixels to fill, and it's something the 37in Sharp AQUOS LC-37D33X LCD pulls off exceptionally well. Across DVD playback and standard-definition cable and TV, its video processor did a superb job of adding the extra detail needed to fill the 1,366 x 768 resolution without compromising too much on quality.

There's still a discernible difference between standard and high-definition playback — we picked up a lot of background noise and over-sharpening along the edges when playing SD content — but if your viewing habits mainly extend to DVDs and free-to-air, the AQUOS LC-37D33X is definitely one of the better options.

As for high definition, the LC-37D33X is a capable performer, albeit without many of the frills that mark the latest HDTVs like 100Hz processing and 24p playback. Using our Blu-ray test discs, the LC-37D33X delivered accurate and natural-looking colour tones across the board, as well as rich black levels and smoothly rendered action sequences. By the numbers, the native contrast ratio of 1,500:1 is low compared to what we're used to seeing, but in practice we found it just as good for depicting dark scenes in faithful detail.

Where it falls short is picture clarity. We found the picture of Blu-ray movies to be a bit soft for our liking, which is ironic given the TV's brand name. Oddly, it appears to be a problem limited to Blu-ray and gaming, as the HD broadcasts on free-to-air were crisp and well-defined. We were also surprised to find no picture modes for switching between presets like Cinema, Standard and Gaming, so you're essentially stuck with one profile for adjusting the contrast, sharpness, colour and brightness across each of the connected video sources.

The speakers — located in a grille underneath the screen — are good enough for day-to-day viewing, but the simulated surround sound mode is a pale imitation of the real thing — you're best off getting a real speaker setup if you want proper 3D audio.

The LC-37D33X has a modest selection of inputs, namely two HDMI, two component, two composite, one S-Video and one D-Sub. This should be adequate for most users, but if you've got a Blu-ray player and games console taking up two HDMI ports, having a third one spare for hooking up a laptop or camcorder would come in handy. All of the ports are located on the back of the TV; unlike most sets, it doesn't include any easy-access ports on the side or front, nor does the bundled stand (which you need to assemble out of the box) have a swivel mechanism for rotating the display. Also missing is a USB port for plugging in a digital camera or flash drive to display photos.

Looks-wise, the LC-37D33X looks like every other entry-level HDTV, with the traditional glossy piano-black frame, square edges and oval-shaped stand — no pulsing lights, colourful bezels or frameless displays here. That said, it's thinner and lighter than most of its peers, measuring less than 2cm thick and weighing only 16kg with the stand attached.

We've seen better HD performance in this price range from other 720p HDTVs, but its excellent standard-definition playback sets the LC-37D33X apart. If you're looking to replace your ten-year-old TV with a large flat-screen but can't see yourself buying a Blu-ray player in the near future, the AQUOS LC-37D33X is a worthy upgrade.

Jenneth Orantia



- CONTACT Sharp
- ONLINE www.sharp.net.au
- MARKET Everyone
- PRICE $1,799

✔ Upscaling; reception; weight.

✖ Blu-ray lacks sharpness.

7/10

Looks great with SD content, but HD could be better.



Samsung BD-P1400

An inexpensive Blu-ray player that's adequate for a budget home theatre system.

At under $600, the Samsung BD-P1400 looks more stylish than its price tag suggests — but it's a basic player with significant limitations. Released in 2007, it only supports Profile 1.0, so it won't be able to play Profile 1.1 bonus features, such as Picture in Picture, or access Profile 2.0 (Blu-ray Live) content when it becomes available.

Appearance-wise, the front of the player has the typical Samsung bevelled edge with glossy black finish. The rear features the usual array of connections including HDMI 1.3, S-Video and composite video, optical and coax digital audio, stereo audio and 5.1 analogue output — a nice touch if you are connecting this unit to an older surround receiver. There is an Ethernet port to allow for upgrading the firmware, but it doesn't support media streaming.

Setting up was straightforward. The remote control fits nicely in the



hand and looks very similar to other Samsung remotes, with buttons that are large without being chunky — although the lack of backlight makes it hard to use in a dark home theatre.

Playback compatibility is an issue, and Samsung specifically warns that "not all discs are compatible and not every disc will play". For this reason, Samsung does provide firmware updates, which can be downloaded via the Ethernet port or burnt to CD.

Even with current firmware, the player will only work with BD-ROM discs (not rewriteables) and may not be compatible with all burnt discs. DVD support is limited to DVD-Video, finalised DVD-R and DVD-RW. CD support is also just the basic CD audio, MP3 and JPEG photo CD.

- CONTACT Samsung
- ONLINE www.samsung.com.au
- MARKET Everyone
- PRICE $595

✔ Inexpensive; easy to set up and use.

✖ Profile 1.0 only; image quality not fantastic.

6/10

Audio support is good for the price, as the unit includes onboard decoding of Dolby Digital Plus, Dolby TrueHD, and DTS-HD. These formats can be output either as PCM over HDMI, or as bitstream if your receiver supports these codecs.

The unit supports full 1080p/24-frame output on compatible televisions and Anynet+ to control Samsung televisions. Picture quality from the test unit was acceptable, but noisy. The tests from Silicon Optix test disc confirmed mediocre noise processing and reasonable (but not outstanding) smoothing of jaggies and handling of motion.

DVD upscaling is offered, but output tends to lose detail, suffers from noise and does not properly handle cadence — which means some programming can look juddery. These faults are probably not an issue on smaller displays but would be quite noticeable on a large panel or projection unit.

We still can't understand why these Blu-ray players need to be DVD-locked, when just about any DVD player you can purchase will play DVDs from around the world.

The unit is inexpensive and picture quality is acceptable, but don't count on using the BD-P1400 for anything fancy or as part of an upmarket home theatre system.

David Neiger

Panasonic DMR-BW500

If you have a spare $2,200, this is the PVR to get.

If you have the cash and want to be able to record high-definition content, the DMR-BW500 is a magnificent piece of kit. It comes with twin high-definition digital tuners so you can record two programs simultaneously to its 500GB hard disk or, if using timer recorder, directly to Blu-ray media.

The unit looks like and weighs about as much as a typical DVD recorder, with large display and silver trim. The rear has an array of connectors including HDMI (Version 1.3 with support for Panasonic's proprietary Viera link), component, S-Video and composite, coax and TOS digital audio and analogue stereo. Two SCART connectors provide additional AV inputs for satellite receivers and there's an Ethernet port for downloading firmware updates and accessing the Gracenote online audio CD database.



The front panel has a power switch, a disc tray open/close switch, blue LED display and front cover that opens to reveal USB and SD card slots, basic transport and recording controls, a FireWire port to connect digital video cameras, and an additional set of S-Video and composite inputs.

Setup is straightforward. Select the state you are in and the Blu-ray recorder automatically finds all available digital channels, sets the clock and loads the EPG. If you have a Panasonic television with a Viera link it will automatically download station information and allow control from the television remote.

- CONTACT Panasonic
- ONLINE www.panasonic.com.au
- MARKET Everyone
- PRICE $2,199

✔ High-definition recording to Blu-ray.

✖ Expensive; no support for streaming media.

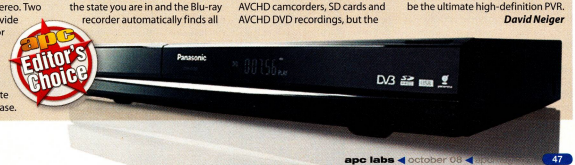
9/10

Recording directly to Blu-ray is only possible with timer record or EPG, and if you want to record to DVD (SD only) you must first record to the hard disk. Got that?

High-definition playback is possible from Blu-ray, the hard disk, AVCHD camcorders, SD cards and AVCHD DVD recordings, but the unit can't record AVCHD content to DVD or memory cards. Support for the current high-resolution audio codecs (including Dolby TrueHD, DTS-HD High Resolution and DTS-HD Master Audio) is also provided.

At the time of writing, the DMR-BW500 is the only Blu-ray set-top recorder on the market. We'd also like to see support for streaming media, DivX, Flash and other internet media but, for now, if you can afford it, this unit would have to be the ultimate high-definition PVR.

David Neiger











HTC Touch Diamond

Did somebody say iPhone killer?

HTC has a reputation for producing some of the best-looking smartphones in the business, but the svelte Touch Diamond — launched less than a month after the iPhone 3G — ups the ante considerably. It's tiny compared to other smartphones, yet it leads the pack when it comes to features: 7.2Mbit/s HSDPA, 802.11b/g Wi-Fi, A-GPS, Bluetooth 2.0, 4GB of internal storage and a 3.2-megapixel camera.

Physically, the Touch Diamond is a stunner, with a luminous 2.8in touchscreen display on the front and a pattern of raised edges on the back. The screen deserves special mention: it has a larger-than-average 480 x 640-pixel resolution that makes graphics pop off the screen. The front and back of the Diamond has a glossy sheen that looks striking, but as with all shiny surfaces, it quickly gets greasy with fingerprints.

The upsized resolution shows off the Diamond's fancy TouchFLO 3D front-end. A bar at the bottom of the screen lets you move between the different sections by sliding your finger across it, and the graphics are even better than the iPhone's: thumbnails for photo speed dials are arranged like a stack of Polaroids, email previews are displayed in white envelopes, and the album art for music tracks are lined up like Apple's Cover Flow.

Windows Mobile 6 Professional is still lurking in the background, though, and if you want to write an email, add a new contact or appointment, you're back to using the old interface. You can tap most buttons using your finger, but we found the software keyboard too small to use without a stylus. The Diamond takes a leaf out of the iPhone's book by magnifying each letter when you press it, but as it's narrower than the iPhone and doesn't have an auto-correct feature, you'll need to resort to the stylus if you want to type quickly.

The Diamond is equipped with all the usual productivity-related software, including the excellent Opera Mobile 9.5 web browser, but it's also well-endowed on the multimedia front. The YouTube client is nearly identical to the one on the iPhone, only you can specify the video playback quality between high quality and fast download. The Telstra-customised Diamond also works seamlessly with Foxtel Mobile and BigPond TV, both of which launch the Streaming Media application in full-screen landscape. Unfortunately, the built-in speaker is weak and distorts at full volume, and since the headphone jack uses a mini-USB connector, you're limited to using the supplied earbuds or a set of wireless Bluetooth headphones.

The Diamond uses a 528MHz Qualcomm MSM7201A processor with 192MB of DDR SDRAM and 256MB of system memory. We found performance to be responsive for most tasks, even with lots of programs open simultaneously. But there are quirks: the software keyboard takes up over half the screen so you can only see one line at a time when writing an SMS, the screen automatically turns off as soon as a call is connected (the iPhone does the same thing but only while the phone is against your ear), and while the the touchstrip is fiddly.

So how does it ultimately compare to the iPhone? Smaller dimensions make it appealing for those turned off by the iPhone's size, and it offers many of the features missing from the iPhone like copy-and-paste functionality, Bluetooth stereo, MMS, video recording, FM radio and a replaceable battery. On a multimedia basis, the iPhone has it beat thanks to more storage, a larger screen, and a standard 3.5mm earphone jack. For business use, on the other hand, features like superior Microsoft Exchange support, full multi-tasking and an open file system structure make the Touch Diamond a better candidate.

Jenneth Orantia

CONTACT	HTC
ONLINE	www.htc.com
MARKET	Everyone
PRICE	$999

✔ Compact; stylish; packed with features.

✖ No memory card slot or GPS software; speaker.

7 10

Uniden TRAX 430

Better known for its landline telephones, Uniden takes on the navigation market.

Uniden isn't a name that's readily associated with portable navigation, but its latest range of TRAX devices proves that it's a force to be reckoned with. The TRAX 430 sits in the middle of the range, with a 4.3in touchscreen and text-to-speech technology for spoken street names, minus the built-in Bluetooth and TMC antenna that's offered with the top-of-the-range 436 model.

The TRAX 430 is a refreshing change of pace from portable navigation devices that try to cram in a heap of extraneous features.

CONTACT	Uniden
ONLINE	www.uniden.com.au
MARKET	Everyone
PRICE	$379

✔ Ease of use; refined functionality.

✖ Fairly basic.

8/10

The 430 concentrates solely on getting you from point A to point B, and it does so in a straightforward and elegant fashion. Right out of the box, it impresses with its ease of use, offering a choice between simple and advanced modes and a selection of voices to choose from. Sadly, you're limited to only four English voices in strong American accents, two of which offer text-to-speech functionality, with no provision for adding other voices.

Aside from the power button on the top, the TRAX 430 is completely free of buttons. Options are selected by tapping on the 4.3in touchscreen, and even in Advanced mode, the menus are nicely laid out and easy to navigate. Entering an address is done by using a virtual on-screen keyboard, and it uses predictive text to minimise the number of letters you need to key in. The exceptional screen has wide viewing angles, vivid colours and a high 480 x 272-pixel resolution.

The TRAX 430 may be limited to basic navigation, but it offers a few features that aren't found in other similar devices. One of these is 3D landmarks that can be rotated 360 degrees so you can view them at all angles. It's more of a gimmick than an aid to navigation, but it's fun being able to see the Sydney Opera House and Queen Victoria Building as three-dimensional models rather than just flat depictions on a map. Multi-lane turn-otts at the end of freeways and major roads also get the benefit of an indicator at the bottom of the screen that shows you which lane you need to be in to make the next turn.



The TRAX 430: straightforward and elegant navigation.

Uniden has done a great job of making navigation a no-brainer. Acquiring a satellite lock takes less than five seconds, and the main mapping screen is nicely laid out and easy to follow. Turn-by-turn directions from the built-in speaker are reasonably loud, but it can be difficult to hear if you've got music playing simultaneously. Upcoming turns are announced well in advance, and the voice guidance prompts you at regular intervals from over a kilometre away. When you're driving through tunnels — which is most commonly when you lose GPS signals — navigation continues along at the speed limit to guide you into the correct lanes and exits. If you miss a turn, the TRAX picks it up quickly and provides an alternative route within a matter of seconds.

Out of the box, the TRAX 430 is set up to alert you when you're driving over the speed limit, and you can also set it up for speed camera warnings and a safety mode that prevents you from operating the device while driving. The warnings are handy for avoiding traffic violations.

The TRAX 430 is a strong competitor at the entry-level end of the market, and if you're mainly after a portable GPS with a large screen and solid navigation functionality, this device is just as good as the ones from the more popular brands. As an added bonus, the TRAX 430 comes with New Zealand maps worth $170.

Jenneth Orantia



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	Netplus Micro Computers	08 9242 7288	www.netplus.com.au

Nikon Coolpix S550

Smile, this Nikon's watching you!



Nobody can say that Nikon doesn't keep the compact camera market well stocked with flashy new digital cameras. It seems like every few months they've got something bigger and better than before for us to look at. The recently released Coolpix S550 is a case of extreme bang for your buck, as this slightly-less-than-average size compact is crammed full of features that you usually only see in DSLRs — plus some we've never seen before at all.

Electronic Vibration Reduction for ensuring sharper low light/ long exposure images paired up with an ISO of up to 2,000 allows for a greater shooting range than many competing models.

Face priority is a recent addition to compact digitals that allows the camera to find faces within the frame (up to twelve) and use them as focusing and exposure-measuring points to ensure that people within your pictures come out looking their best. Nikon has taken this feature a step further with the addition of Smile Mode and Blink Warning. Once faces have been identified within the frame, the sensor will wait for the faces to smile before instantly catching that moment. Not only that, the S550 will tell you if somebody blinked so you can take the photo over again. And, if they didn't blink, it will automatically correct any red-eye. Crikey! At this rate the camera user will soon be made obsolete.

Despite all the fancy gadgets, the S550 is a simple, easy-to-use compact. All the previously mentioned modes are easily turned on and off via an intuitive menu system with easy-to-recognise symbols for the beginners. Its 10-megapixel sensor takes decent images for the everyday snapper, but its performance may seem a little on the slow side for more experienced users.

Image quality and colour are both up to par for the average user, although, as with most compacts, we wouldn't advise trying to enlarge your images to anything larger than a 5 x 7in print — as the limitations of the image sensor will soon become noticeable.

If you are in the market for a reliable digital compact that can be shoved in your pocket for taking taking good, clear family-sized happy snaps, then the Nikon Coolpix S550 is for you. With good looks, great features and enough high-end gadgetry onboard to make photography easy. This is one compact camera that will be sure to entice many new users to the Nikon brand.

Christopher Zammit

CONTACT Nikon
ONLINE www.nikon.com.au
MARKET Everyone
PRICE $349

✔ Cheap; good quality; loads of features.
✖ Image quality good but not amazing.

9/10

Sony Alpha DSLRA300X Twin Lens Kit

Packed with features and reasonably priced.



Sony's acquisition of Minolta seemingly has the company creating a market strategy aimed at getting users to upgrade from compact digitals to DSLRs, by offering a decent upgrade path with good equipment, excellent flexibility and a competitive price.

And so the Sony Alpha 300 twin lens kit is born, consisting of the main Sony Alpha 300 body and a pair of lenses — in this case an 18mm–70mm F3.5-5.6 and 55mm–200mm F4-5.6. Put a 2x converter on there, and you pretty much have everything covered in the distance/wide angle department for your average DSLR user.

SLR and DSLR bodies have evolved over 50 years, almost to the point where there is little room left for improvement. I've found I have a problem with the Alpha 300, as the viewfinder doesn't extend far enough from the main body. If you are right-eye dominant it's not too much of an issue, but more people are left-eye dominant than you may realise. These people (like me) may find their nose getting squashed up against the otherwise excellent LCD screen.

Someone with a basic knowledge of photography can pick up most of the Alpha 300's operations from the inbuilt menu. If you need to, however, the paper manual is also very handy.

Other technologies have also been utilised here, as the Alpha 300 doesn't use Sony's Memory Stick for storage, instead relying on the older CF card. I would have thought they'd have started moving to smaller SD cards by now, as they are more flexible and certainly cheaper.

Ports are restricted to AV out, USB, DC in and for a remote control (not supplied). The lack of HDMI out is, in my opinion, a serious omission, considering the market the Alpha 300 is aimed at.

The main stats for specification junkies include: three frames per second shooting, a battery life expectancy of 700+ shots, ISO from 100-1,600 and a shutter speed of up to 1/4,000th.

If you are a Canon, Nikon or Pentax fan, you'll no doubt never even glance at this camera. However, anyone looking to replace an ageing Minolta body will find that the Minolta lenses will fit the Alpha 300. It may also suit photographers who are thinking about dipping their toes in the DSLR waters. At under $1,200 for two lenses and a camera body, it's a great bargain.

David Hague

CONTACT Sony
ONLINE www.sony.com.au
MARKET Prosumer
PRICE $1,149

✔ Excellent colour reproduction; value.
✖ No HDMI out; no cases for lenses.

9/10

Toshiba TDP-SP1

An inexpensive portable SVGA data projector?

CONTACT Toshiba
ONLINE www.toshiba.com.au
MARKET SMB
PRICE $799

✔ Inexpensive; lightweight; images.
✖ Low res; low lamp life; poor quality sound.

7/10

At under $800, the Toshiba TDP-SP1 represents good value for money. Weighing in at under 2.2kg and complete with carry case, the unit is designed to be easily transported.

The front of the unit has a lens with manual focus and 1.1x zoom. The small zoom ratio is not really that much benefit, as you can achieve a similar result by simply moving the projector a little. The back of the unit has a single VGA input (which means you will need a separate switch box if you are using multiple computers), monitor out, S-Video and composite inputs and mini jack stereo audio inputs to drive the tiny inbuilt mono speaker. There is also an RS-232C (serial) cable to allow you to control the projector from the computer as well as Kensington key lock to secure it. At the top of is the zoom control, buttons to control the menus, keystone and speaker volume, power switch, indicator light and temperature warning lamp.

Setting up the projector was very easy, as the unit automatically detected the computer input, adjusted the resolution and was producing images in around 33 seconds from plug in. Having access to the digital keystone control from the top of the unit was particularly handy, as there was no need to navigate menus for basic setup.

If you want to adjust colour, select eco mode (reduced brightness in exchange for longer lamp life) and select 16:9 widescreen mode (for playing back of video), these functions are accessible by pressing the menu button or via the wireless remote control.

While the unit has only SVGA (800 x 600) resolution, it will accept inputs up to SXGA (1280 x 1024) and 1080i widescreen. High-res images are scaled or cropped, resulting in a loss of detail, so you can't really use this projector for large complex spreadsheets or engineering drawings. The unit can scale 16:9 video to the correct aspect ratio but works like an older TV, placing black bars above and below the image.

Being SVGA, the projector is effectively limited to PowerPoint-type presentations and SD video.

Rated at 2,200 lumens, the image is not as bright as some projectors on the market but adequate for most use. We tested it at three metres and found the image was bright with rich colours even in moderate lighting. Toshiba claims a contrast ratio of 2,000:1, which is typical for projectors in this price range and adequate for video and presentations.

The projector uses DLP, which provides excellent colour rendition with a good range of grey scale, but suffers from the 'rainbow effect' when watching high-contrast moving video. Our test unit performed better than some other projectors we have seen, and while the inevitable screen door effect (thin lines around each pixel) was present, it was not really noticeable from a normal viewing distance.

The sound from the fan, even during full power mode, was barely noticeable: less than what you would get from most notebooks. In eco mode you would barely hear the unit over room air-conditioning.

The TDP-SP1 is relatively inexpensive and light enough to carry around with you all day. It is great for presentations and showing SD video, but with a lamp life of up to 2,000 hours could be a little expensive on the consumables.

David Neiger



Cheap and portable — just don't expect HD quality.


Plenty of ports means you should have no connectivity problems.

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Protect your phone

Does your mobile really need security software?

CONTACT	Symantec
ONLINE	www.symantec.com
MARKET	Everyone
PRICE	$52

✔ Quick and efficient.

✖ Of little real use.

4/10

Here are a few questions which shouldn't be too difficult to answer. Are you tech-savvy enough to carry a smartphone around with you? Do you spend a lot of your time at conferences with Bluetooth switched to 'discoverable', while simultaneously clicking 'accept' whenever a random person tries to send you a suspicious-looking file? Have you managed to stumble on to the one dark corner of the net which hosts mobile malware? If you've answered yes, then you *might* need to think about a software solution to secure your precious smartphone.

Look at the state of the mobile virus world and you'll see some fairly early primordial soup. Yes, there is a small collection of files that have evolved past their single-cell stage to become classified as bona-fide viruses. And yes, cunning scientists (or, more correctly, thick-skulled dunces) have managed to instigate breeding through inefficient, insecure use of their mobiles coupled with a smattering of willing user interaction. But this is on an atomically minute scale. The level of threat from mobile malware is low because there simply isn't much opportunity for infection: Bluetooth transfers need to be authorised by both sides before they can complete; mass-distribution of files to mobile phones is an unexplored avenue; and the fact is that the majority of smartphone users don't install additional software on their phones. Those that do are generally pretty selective about it.

Sadly, it's almost sickeningly inevitable that malware will become more of a threat as mobile technology evolves. Always-on data connections and improving mobile processors will make malware activity imperceptible, while new transfer methods — like the password-free Near Field Communication — will make the spread of these applications much more straightforward. Even now, more and more phones are carrying Wi-Fi radios, opening them up to a much wider field of attack. We currently can take solace in the fact that so many mobile platforms are incompatible, but that may not be the case in the future, particularly as automatic, ubiquitous connection to high-bandwidth networks becomes commonplace.

So, do you need Norton Smartphone Security at this time? No. You really don't. The most time-consuming part of writing this review was searching for anything that might actually be a threat to our test phone. Symantec's selling point for NSS is, and we quote, "mobile virus variants... have almost doubled every six months since 2004". Which is quite true. But it's a poor benchmark: there were only around five distinct mobile viruses in 2004. Even now only one or two mobile viruses out of a few hundred have exited the lab with any sort of success, usually as trojans attached to too-good-to-be-true applications. In terms of devices that won't benefit from the additional bloat of antivirus, weedy smartphones are high up the list.

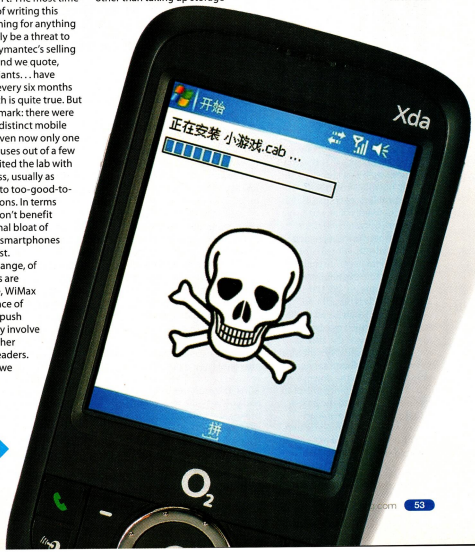
All this will change, of course. Networks are increasing in size, WiMax has a vague chance of catching on and push email will one day involve full messages rather than message headers. But by that time we will be worrying about protecting different, more universal platforms — comparable hardware to the desktop, perhaps running the same operating systems, all tucked away in our pockets. With any luck, the uniquely mobile-based virus will never get a proper chance to evolve.

Here's the truth: we tested Smartphone Security for a solid month and never managed to trigger any of its advanced features. This isn't an assessment of the software; it's an assessment of what it did to our phone.

The answer is — very little, other than taking up storage space and available memory.

There's really no need for this to exist. Windows Mobile is structured in such a way that it protects itself, as does Symbian, so the only real margin of error is a personal one. Yes, the virus scan is quick and efficient (we would expect nothing less given the number of viruses that are out there) and there's a firewall, which could certainly help in terms of Wi-Fi interception. But you're much better off looking at disaster recovery rather than prevention, because you're more likely to have a smartphone disaster by inadvertently tossing your handset off a cliff than through a virus attack. To ward against this, SPB Backup or O2's new contact backup service spring to mind.

Alex Cox



Norton Smartphone Security: have you been randomly downloading from suspicious Chinese web sites again? Oh dear.



AFFORDABLE MOBILE BROADBAND

Mobile broadband can now be a viable replacement to ADSL or cable, writes *Dan Warne*. But you still have to pick your provider carefully.

If there's one thing that we've learned over the years of testing wireless broadband networks at *APC*, it's that they start out good when first launched and then go downhill from there.

The problem, of course, is that wireless networks of any sort share bandwidth between users, so unless the network is managed carefully, with additional capacity added as extra users are signed up, they can become painfully slow.

The last time an *APC* tester assessed wireless broadband performance (when 3G was still limited to 384Kbit/s maximum speeds), Optus was the clear winner, as it offered a symmetrical 3G wireless broadband service with 384Kbit/s on both the downstream and upstream. Its choice of laptop modems also offered the best actual download and upload speeds in the locations we tested.

But since then, a lot has changed — Telstra has shut down its CDMA/EV-*DO* network, rolled out Next G, and Three/Optus/Vodafone have been engaged in a heavy discounting price war in wireless broadband, with plans as low as $15 for 1GB per month to $39 for 6GB per month (both on Three).

Normally, *APC* would be all for price competition and reduced prices, but our alarm bells start ringing when we start getting regular reader complaints about appalling network performance on some of these mobile networks.

The reader forums at *APC*, Whirlpool and SMH have been buzzing with discussion threads about Virgin Broadband in particular — one of the first truly affordable home broadband services offered over the Optus 3G/HSDPA network. "Everything bad you've heard about Virgin Broadband is true," wrote one commenter. "They are a nightmare. It is broadband at dialup speeds or worse; it is having dropouts five times a minute on the phone."

Of course, *APC* Labs is about real results, not unproven anecdotes. So we decided to put all the mobile broadband services through their paces to see what their true performance was like.

VIRGIN BROADBAND

First cab off the rank for our testing was Virgin Broadband. We have to admit that we made a big deal out of this when it was first released — for $60 a month with 4GB data, unlimited calls to landlines Australia-wide as well as unlimited calls to Virgin Mobiles, it seemed like an unbeatable deal. At launch time, network performance was very good on the Optus network (Virgin Mobile's parent company and network provider) — we measured speeds of 500-700Kbit/s.

Boy, did Virgin Broadband turn out to be a lemon. Shortly after launching, it chopped the data allowance for new customers in half from 4GB to 2GB. Then, as it signed up customers wildly, speed across the network started dropping. One of the blokes in our office even signed up to it and regretted it later. Luckily, he was able to escape his 24-month contract, which provided sub-dialup internet speeds and call dropouts.

(Refer to our note in the introduction about wireless networks performing well when first switched on and going downhill from there.)

Our testing showed that Virgin Broadband hasn't made much headway in improving its network performance. In fact, when we loaded the speedtest.net page through the VB USB modem, it took one minute and 59 seconds to even display the page. To give you an idea of how bad that is, on Vodafone, a network that isn't exactly known for its outstanding coverage, it only took 20 seconds. On the best-performing network,

HOW WE TESTED



One way of testing a network is to perform upload and download tests to a fast file server and measure the throughput speed. This is a good way of testing networks that are known to be reliable — like ADSL2+ or cable networks, for example.

However, we decided to test the wireless broadband services doing tasks that normal people do every day, such as viewing web pages and videos on YouTube.

For each wireless broadband provider, we loaded the following pages:

- *Sydney Morning Herald* homepage
- *Lonely Planet* homepage (since Steve Jobs famously used this to demonstrate the increased speed of the iPhone 3G)
- The streaming video bandwidth meter on the ABC's iView TV-on-demand service
- The speed test at *www.speedtest.net*, using a Sydney-based server for the tests
- An example video from YouTube (one-minute length)
- The same video in 'high quality' on YouTube.

> OUR ALARM BELLS START RINGING WHEN WE START GETTING REGULAR READER COMPLAINTS ABOUT APPALLING NETWORK PERFORMANCE

Telstra, it took 15 seconds, and on an ADSL2+ connection it took 10 seconds.

Using the Virgin Broadband home gateway, we got 'page not found' the first four or five times we tried to access speedtest.net — then, inexplicably, the sixth time it connected OK. (The modem was connected to HSDPA at the time — it said so on the screen, and we'd been doing other testing in the previous 60 seconds.)

Ping time on Virgin was truly atrocious — 982ms (nearly a whole second), which would make VoIP or gaming absolutely impossible. This long ping time also slows down the loading of web pages with many elements dramatically, because the stream requests to the web server at the other end is slowed down by the delays in the return path.

To be honest, we don't know how Virgin or its parent company Optus can go on selling this product in good conscience. It should be withdrawn from sale until the network quality issues are addressed. Clearly, our test results are not isolated — online forums are overflowing with complaints from users about substandard service and the pain of being locked in to a two-year contract.

We asked Virgin Mobile CEO Peter Bithos about the problems and he referred us to the company's network provider, Optus. Optus took two days to reply to our enquiry, with a generic, non-specific statement that it was committed to continual improvement in network capacity.

OPTUS

Optus is the network that carries the much-complained-about Virgin Broadband service, so we were interested to see how its own Optus-branded wireless broadband services would work. An Optus spokesperson assured us it wouldn't have launched wireless broadband services under its own brand name unless it could be sure it could deliver a good-quality connection.

So how did it work? In our experience: badly. We couldn't receive an Optus 3G signal in the *APC* labs at all — we tested near a window on level 23 of an office building in the Sydney CBD, so we were well within Optus' claimed coverage area, with no obstructions between us and the base stations.

Optus' explanation was, first, that this is an inherent problem with high locations (though this does not explain the fact that we could receive the other mobile networks OK) and, second, that it's because our building is in view of so many towers that devices flip from one base station to another continually.

But that's enough sour grapes from us about our office reception. We relocated to another place nearby at ground level in the CBD

JARGON BUSTER!

Wireless broadband has many acronyms; unless you're a real enthusiast, it can be hard to keep up. Here are the important ones demystified:

GPRS: General packet radio service — the slow mobile data connection you get on 2G mobile networks. This is slower than dialup internet.

EDGE: An upgraded version of the GPRS mobile data standard that runs on Telstra's 2G mobile network only. EDGE provides roughly twice dialup speed.

3G: Networks built using the wideband CDMA (WCDMA) standard. Basic 3G networks only offer speeds of up to 384Kbit/s.

HSDPA: High speed downlink packet access. Also known as 3.5G. Offers network speeds from 1.8Mbit/s downstream through to 14.4Mbit/s (depending on the network). This speed is shared among all users connected to a tower. As the 'D' in HSDPA stands for 'downlink', this means the network speed is only fast for downloads — upload speeds still dawdle along.

HSUPA: The upgraded version of HSDPA, which also provides a very fast upload speed up to 5.76Mbit/s.

HSPA: High speed packet access — the umbrella term for HSDPA/HSUPA technologies up to 22Mbit/s speed.

HSPA+: The upgrade to the HSPA standard, which will ultimately allow 42Mbit/s per cell. This will require physical tower antennae upgrades by telcos, though, so it's expensive and still quite a way off.

LTE: Long-term evolution — the evolving standard that's likely to be dubbed "4G", though it is officially part of the 3G standards. It has been demoed running at up to 200Mbit/s in a cell.



Optus is making its mark with cheap plans, but is the service up to scratch?

and could get the Optus 3G signal. However, at this location — and others we tested — we found web pages loaded via the Optus connection would quite often display with jumbled layouts. This is probably due to the Optus network losing data packets, with some requests from our web browser timing out due to this packet loss.

The latency on the network — the time between sending a single packet to a test server and receiving an acknowledgement back — was approximately as awful as Virgin's, at nearly a whole second. By comparison, Telstra provided latency five times faster than that, at around 200ms on most pings.

Playing a YouTube video on Optus is also impossible — it stops to buffer every few seconds, indicating the network isn't able to carry data fast enough. (YouTube videos are encoded to a very low quality, capable of being played on pretty slow broadband connections, so it's a bad sign that Optus' network can't handle them.)

Optus is making its mark in the marketplace at the moment with a plethora of cheap plans, including no-contract prepaid wireless broadband deals, and a wireless version of Optus Fusion with 2GB data, unlimited calls to landlines and Optus Mobiles (which are quite attractive), but we couldn't recommend them based on our testing of their service quality.

TELSTRA

Play a word association game starting with the word Telstra, and you'll probably get responses including 'expensive', 'rip off', 'arrogant' and many other words we can't print here. It seems everyone has had a horrible experience with Telstra at one point or another (not least of which is the resentment of being forced to pay Telstra's constantly increasing landline line rental tax each and every month).

Yep, Telstra sure is expensive. And it has an extremely abrasive 'like it or leave it' approach to dealing with customers, government, regulators and so forth, essentially borne from years of being a monopoly.

But now that we've got that off our chest, it's undeniable that the Next G network is an incredibly good network. The prices are very high — Telstra doesn't just tack 25 per cent on to the average market price; it charges three to four times what the competitors are asking to get a wireless broadband service with a similar amount of data.

But, in our testing, we can see why. Next G wireless broadband services really work well. We were able to play streaming YouTube videos in high-quality mode with no buffering delays at all. And the fact that you can use it basically anywhere with full network speed makes it perennially useful.

Speed tests showed a download speed of over 4Mbit/s and an upload speed of 800Kbit/s. It was the only wireless broadband service we tested that provided enough performance to view ABC's TV-on-demand service, iView, consistently well.

Just as this article was going to press, Telstra dropped the pricing on its Next G broadband plans significantly. Now, they're still expensive compared to the other telcos, but if you ignore the value difference, the actual prices are tolerable for what you get. For example, the basic plan on Telstra BigPond Wireless is now 400MB for $39.95. As long as the wireless card is not your sole broadband service, but is only used for infill when you're out and about, 400MB could well be enough to get you through a month. 1GB costs $59.95, and plans now range through to 10GB for $129.95.

Modem options: pick a card, any card.



PROVIDERS

NETWORK	URL	PLANS
Telstra Mobile	www.telstra.com	Plans from $5 (5MB) to $380 (10GB)
BigPond	www.bigpond.com	Plans from $39 (400MB) to $129 (10GB)
Optus	www.optus.com.au	Plans from $29.99 (1GB) to $100 (9GB)
Vodafone	www.vodafone.com.au	Plans are $29.95 (1GB) and $49.95 (5GB)
Virgin Mobile	www.virginbroadband.com.au	Plans from $39 (5GB mobile) to $70 (4GB home)
Three	www.three.com.au	Plans from $15 (1GB) to $49 (7GB)

MODEMS

Depending on which provider you want, numerous modem options and plans are available.

MODEM OPTIONS	FORM FACTOR	PRICE
Three USB Modem	USB soap on rope	$149
Three Internet Key	USB key	$149
Three Laptop Card	ExpressCard34	$399
Optus Internet Key	USB key	$199
Optus InZone Wireless Router Modem	4-port Ethernet, Wi-Fi	$300
Telstra Mobile Turbo 3 Series	PCMCIA	$299
Telstra Mobile Turbo 7 Series	ExpressCard34	$299
BigPond Mobile Card	PCMCIA	$299
BigPond 7.2Mbit/s Express Mobile Card	ExpressCard34	$299
BigPond 7.2Mbit/s USB Mobile Card	USB tic-tac box	$299
BigPond Home Network Gateway	4-port Ethernet, Wi-Fi	$299
Virgin Broadband USB Key	USB soap on rope	$0
Virgin Broadband Standard Modem	4-port Ethernet, Wi-Fi	$0
Vodafone Internet Key	USB soap on rope	$249
Vodafone Express Mobile Card	ExpressCard34	$299





Certainly, Telstra is maintaining its network quality by restricting demand with its high prices. But at least for the money you pay, you get a service that actually works reliably.

THREE

There's a lot to like about Three: it is basically responsible for pushing prices down across the whole industry, with its constantly increasing allowances on its wireless broadband plans. At the time of writing, it was offering 1GB for $15 a month, through to 7GB for $49. The latter plan is enough data to be used as a home broadband substitute — though, at this stage, Three only offers USB modems, no home gateways with Wi-Fi.

The big downside of Three is that its population coverage with 3G is only about 60 per cent, so outside of the greater metropolitan areas of each state you will roam to Telstra 2G and get dialup speeds on GPRS. You'll also be paying $1.65 per MB used when roaming, on top of your plan fee (though each plan does come with a few megabytes of included roaming allowance). It's also worth bearing in mind that GPRS is so slow that you're unlikely to use very much data in this mode. Also, you can lock the modem to 3G only, to avoid roaming altogether.

Three has signed a roaming agreement with Telstra for parts of its Next G network too, in areas of the country where Three is seeing a lot of roaming usage. However, the current modems it sells aren't compatible with the 850MHz frequency used by the Next G network, so beware that if you buy a modem now you may need to buy another one down the track to get access to the high-speed 3G roaming. Three says it has renegotiated roaming fees with Telstra, so hopefully roaming to Next G will be cheaper.

Our testing of Three provided impressive results. Speed tests showed around 1.6Mbit/s download and 350Kbit/s upload, with a latency of 235ms. That's not as blisteringly fast as Next G, but it's a lot better than Optus and Vodafone. Video streaming performance on the ABC TV iView test meter showed results fluctuating up to 500Kbit/s, so it wouldn't be ideal for watching streaming TV. We were able to watch a YouTube video all the way through with only a brief buffering pause when the YouTube page loaded a new advertisement. Bandwidth wasn't good enough to watch a YouTube 'high-quality' video without pausing every few seconds, though.

VODAFONE

Vodafone's pricing is reasonably competitive compared to Optus and Three, with plans offering 1GB for $29 or 5GB for $49. One very good point about Vodafone is that if you plan to travel overseas, Vodafone has by far the cheapest global roaming rates.

The casual roaming rate is $10/MB (half what all the other telcos charge), but it also offers roaming plans that offer a certain number of megabytes at a reduced rate ($49 for 25MB or $199 for 120MB). Yes, those prices are still high, but brownie points to Vodafone for reducing them well below what the other telcos charge.

Vodafone offers a Huawei ExpressCard for notebooks, or a USB modem, though the one we were supplied for testing was the older 'soap on a rope' style Huawei E220 — we'd have preferred to see Vodafone using the new memory-stick style modem from Huawei.

Our testing of Vodafone's network performance provided very slow results — but at least without the data corruption evident on the Optus network. Loading the SMH homepage to the point where the first screen of content was showing took 16 seconds. Loading it completely took 51 seconds.

When we loaded a YouTube video, it took a ponderous 58 seconds to start playing, and then buffered every couple of seconds. Speedtest.net reported 317Kbit/s download speed and 111Kbit/s up, with a 289ms ping time. That's barely better than standard 3G, though the relatively low ping time shows that Vodafone's network is more responsive than the one used by Optus.

MOBILE BROADBAND PLANS

	PLAN NAME	PRICE	MB INCLUDED	CREDIT EXPIRY	EXCESS PER MB	EXCESS PER MB ROAMING	BILLING INCREMENTS	OS SUPPORT	CONTRACT
V-FUNK	Light Use	$29.95	1,000	N/A	$0.10	N/A	1KB	XP, Vista, Mac	24 mths
V-FUNK	Heavy Use	$49.95	5,000	N/A	$0.10	N/A	1KB	Xp, Vista, Mac	24 mths
THREE	$15/mth	$15	1,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	24 mths
THREE	$29/mth	$29	2,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	24 mths
THREE	$29/mth	$29	3,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	24 mths
THREE	$39/mth	$39	6,000 + 4 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	24 mths
THREE	$49/mth	$49	7,000 + 5 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	24 mths
THREE	$15/mth no contract	$15	1,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$29/mth no contract	$29	3,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$49/mth no contract	$49	6,000 +42 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$29/mth (smartphone)	$29	1,000 + 2 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$49/mth (smartphone)	$49	2,000 + 4 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$69/mth (smartphone)	$69	3,000 + 6 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
THREE	$99/mth (smartphone)	$99	5,000 + 10 Roaming	N/A	$0.10	$1.65	1KB	XP, Vista, Mac	No contract
OPTUS	yes' Wireless 1GB	$29.99	1,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	yes' Wireless 2GB	$44.99	2,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	yes' Wireless 5GB	$49.99	5,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	yes' Wireless 6GB	$59.99	6,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	Wireless 'yes' Fusion	$79	2,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	Wireless 'yes' Fusion	$89	7,000	N/A	$0.15	N/A	1KB	XP, Vista, Mac	24 mths
OPTUS	Pre-paid starter kit	$199	2,000	30 days	N/A	N/A	10MB*	XP, Vista	No contract
OPTUS	Prepaid broadband	$30	2,000	30 days	N/A	N/A	10MB*	XP, Vista	No contract
OPTUS	Prepaid broadband	$40	3,000	30 days	N/A	N/A	10MB*	XP, Vista	No contract
OPTUS	Prepaid broadband	$50	5,000	30 days	N/A	N/A	10MB*	XP, Vista	No contract
OPTUS	Prepaid broadband	$70	6,000	60 days	N/A	N/A	10MB*	XP, Vista	No contract
OPTUS	Prepaid broadband	$100	9,000	60 days	N/A	N/A	10MB*	XP, Vista	No contract
TELSTRA MOBILES	Mobile broadband	$5	5	N/A	$1	N/A	1KB	XP, Vista, Mac	No contract
TELSTRA MOBILES	Business mob. broad.	$10	150	N/A	$0.50	N/A	1KB	XP, Vista, Mac	No contract
TELSTRA MOBILES	Business mob. broad.	$29	300	N/A	$0.25	N/A	1KB	XP, Vista, Mac	No contract
TELSTRA MOBILES	Mobile broadband	$39	400	N/A	$0.25	N/A	1KB	XP, Vista, Mac	No contract
TELSTRA MOBILES	Business mob. broad.	$89	5,000	N/A	$0.25	N/A	1KB	XP, Vista, Mac	No contract
TELSTRA MOBILES	Business mob. broad.	$119	9,000	N/A	$0.25	N/A	1KB	XP, Vista, Mac	No contract
BIGPOND	Wireless Broadband	$39.95	400	N/A	$0.25	N/A	1MB	XP, Vista, Mac	12 mths
BIGPOND	Wireless Broadband	$59.95	1,000	N/A	$0.25	N/A	1MB	XP, Vista, Mac	12 mths
BIGPOND	Wireless Broadband	$89.95	3,000	N/A	$0.25	N/A	1MB	XP, Vista, Mac	12 mths
BIGPOND	Wireless Broadband	$129.95	10,000	N/A	$0.25	N/A	1MB	XP, Vista, Mac	12 mths
VIRGIN	Broadband at Home	$60	2,000	N/A	Free**	N/A	1KB	XP, Vista, Mac	24 mths
VIRGIN	Broadband at Home	$70	4,000	N/A	Free**	N/A	1KB	XP, Vista, Mac	24 mths
VIRGIN	Mobile Broadband	$39	5,000	N/A	Free**	N/A	1KB	XP, Vista, Mac	24 mths
iPRIMUS	Speedster	$30	1,000	N/A	Free**	N/A	1KB	XP, Vista	24 mths
iPRIMUS	Speedster	$50	6,000	N/A	Free**	N/A	1KB	XP, Vista	24 mths
iPRIMUS	Speedster	$80	12,000	N/A	Free**	N/A	1KB	XP, Vista	24 mths

* First 30MB per day counted as 10MB. ** Speed reduced to 64Kbit/s once download limit reached. *** iPrimus announced its plans the day we went to print, so we weren't able to test them. They are provided via Optus' network.



SEE OUR TEST RESULTS VIDEO ONLINE!

WE FILMED THE RESULTS OF OUR TESTS ON EACH PROVIDER, SO YOU CAN SEE THE REAL PERFORMANCE OF THE WIRELESS INTERNET ON TELSTRA, OPTUS, THREE, VODAFONE AND VIRGIN BROADBAND.

GO TO apcmag.com/wireless2008.htm

ENSPIRE



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- APC June 2008

Vitesse GX

Intel Core 2 Duo E8400 (3.0GHz)
2GB 800MHz DDR2-SDRAM
512MB Radeon HD4850
320GB 7200rpm HDD
16X DVD+/-RW DL
Samsung 22" Widescreen TFT
Windows Vista Home Premium

$1499 Inc GST

Lightspeed

Intel Core 2 Duo E8600 (3.33GHz)
4GB 800MHz DDR2-SDRAM
512MB Radeon HD4870
640GB 7200rpm HDD
16X DVD+/-RW DL
Samsung 22" Widescreen TFT
Windows Vista Home Premium
(available overclocked to 4.0GHz)

$2339 Inc GST

Lightspeed DDR3

Intel Core 2 Quad Q9550 (2.83GHz)
4GB 1333MHz DDR3-SDRAM
2GB Radeon HD4870X2 CrossFireX
OCZ Core 64GB SSD Drive
750GB 7200rpm HDD
16X DVD+/-RW DL
Integrated Wireless-N
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THE TEST RESULTS

Note: Internode ADSL2+ is not a wireless broadband service (obviously), but we ran all the tests on it too to provide a comparison to the wireless results.

Test 1 LOAD SYDNEY MORNING HERALD

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
SMH: load time for main content	9 sec	4 sec	15 sec	6 sec	10 sec	1 sec
SMH: load time (complete page)	22 sec	8 sec	51 sec	25 sec	33 sec	3 sec

One of the most common things you'd do on wireless broadband while filling in time? Check the homepage of your city's major newspaper. Since we were testing in Sydney, we loaded the SMH homepage on each network and timed how long it took for the basic content to appear, as well as for the full page to load. Differences were staggering!

Test 2 LOAD MICROSOFT.COM

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
Microsoft.com: load time	28 sec *	15 sec	31 sec	19 sec	56 sec	11 sec

Another major web site you might visit in your wireless broadband travels is Microsoft.com. We loaded the homepage and timed how long it took on each network.

Test 3 LOAD LONELYPLANET.COM

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
LonelyPlanet.com: load time	17 sec	10 sec	38 sec	30 sec	45 sec	9 sec

Why Lonely Planet's homepage, you ask? Fair question. It's because Steve Jobs used it to demonstrate the speed of the iPhone 3G compared to the original iPhone. We figured it would be an interesting test to run on each mobile broadband service for comparison. Vodafone, Three and Virgin were the dog performers here: the first time we tried to load LonelyPlanet.com, the request never completed, with the page getting stuck half way. On a repeated attempt the page was sluggish to display images.

Test 4 ABC TV ON DEMAND

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
ABC iView's bandwidth meter – min. speed	206Kb/s	621Kb/s	171Kb/s	29Kb/s	27Kb/s	756Kb/s
ABC iView's bandwidth meter – max. speed	863Kb/s	1,864Kb/s	416Kb/s	562Kb/s	333Kb/s	5,705Kb/s

National broadcaster ABC now offers full-screen TV on demand through its new 'iView' service — another good reason to have broadband. The service requires 1.1Mbit/s, which theoretically should work with *all* of these wireless broadband services. But does it? We used the ABC's streaming TV bandwidth meter to see how these services really performed.

Test 5 ONE-MINUTE YOUTUBE VIDEO

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
Smoothness of watching a YouTube video	Poor (repeated buffering)	Excellent (no pauses)	Poor (repeated pauses for buffering)	Very good (one pause)	Poor (repeated pauses for buffering)	Excellent (no pauses)
Smoothness of watching a YouTube HQ video	Poor (paused every 3 secs)	Excellent (no pauses)	Poor (repeated pauses for buffering)	Poor (repeated pauses for buffering)	Poor (repeated pauses for buffering)	Excellent (no pauses)

If you can't watch YouTube on your broadband service, what's the point of having broadband? But seriously, YouTube sets the bar pretty low for broadband requirements; its videos are encoded at a very low bit rate so they'll play on most connections. We also tried watching the same video in 'high quality' mode: a more bandwidth-intensive mode. What was most noticeable on repeated tests with the Optus network was that the results were unpredictable. Sometimes pages would load incompletely or with incorrect styling, probably indicating packetloss (see our video of trying to watch YouTube on Optus! **http://apcmag.com/wireless2008.htm**).

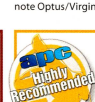
Test 6 SPEED AND LATENCY TESTING

	OPTUS	TELSTRA	VODAFONE	THREE	VIRGIN	INTERNODE ADSL2+
Speedtest.net Upload speed	329Kb/s	522Kb/s	111Kb/s	350Kb/s	335Kb/s	787Kb/s
Speedtest.net Download speed	920Kb/s	3,728Kb/s	317Kb/s	1,628Kb/s	636Kb/s	13,254Kb/s
Speedtest.net Ping	999ms	165ms	289ms	235ms	982ms	33ms

We used the speedtest.net service to measure real throughput speeds on all the services, as well as ping time — the time it takes for a request to be sent to a remote server and for a response to be received. Ping time is important for VoIP, gaming, and can even affect the speed of web browsing if pages have many elements in them (which most do these days). Anything around 200ms (a fifth of a second) is tolerable. Mobile networks traditionally have very poor ping times, but HSPA technology has improved latency a lot. Here's how our test networks performed — note Optus/Virgin's horrendous ping time, near one second.



Telstra Next G. Based on performance alone, it's clear there can be no other choice for mobile broadband. Its performance is the only one that comes close to being a home broadband replacement service. Its pricing is certainly high, but a quality product does cost more to provide— we'd put our money with Telstra Next G.



Three. Given Three's price-leading nature in the market, we were surprised that its network performed so well against Vodafone and Optus. Perhaps its early adoption of 3G technology compared to the other two has given it more time to work out the kinks and optimise the network. Whatever it is doing appears to be working!

ZERO.

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When you bought your UPS, you chose it for critical uptime to protect your network applications. So as the industry leader, it's our job to inform you that an aging UPS battery puts your network reliability and your peace of mind at risk. If you are converging and consolidating your networks, upgrading your equipment, or deploying new servers, be warned: an older UPS simply cannot handle the increased loads and criticality — putting your entire network at risk of costly downtime, unsafe shutdowns, and data and equipment loss.

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Upgrade today to receive your Trade-UPS rebate!
(To upgrade today see the three easy steps to improved power protection!)

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- Serial number
- Capacity in volt/amps (VA)
- Number of units

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- Standard 2 year warranty
- Upgrade Options

Step 3: Register
- Receive a rebate!*
- FREE return shipping of old units
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STORAGE MADNESS

Mitchell Oke selects five top options for increasing your storage.

Building a PC has become a much simpler task in recent years, but choosing the right components can be bewildering. The sheer number of products in every category of hardware can make it difficult to make a decision. This month we've lined up five hard drives, all aimed at different user needs, to make building or upgrading a PC just a bit easier.

The majority of motherboards made today have SATA ports in addition to the ageing IDE connector. So, which type of drive should you choose? SATA drives have a much smaller and more flexible cable, making it easier to route inside your computer case. They are also plug and play, and can be connected even when your PC is running. While that isn't of much use for the average consumer, it can be handy if you use regular drives for backup purposes. There are also no jumpers to set. The newer interface also offers greater data transfer rates, important in high-end, high-performance drives like the Western Digital VelociRaptor.

You'll notice on a lot of hard drives these days the term 'perpendicular recording', but what does that mean for you the consumer? It all refers to the way that the magnetic poles of the data are aligned with the surface of the disk platter. Originally, hard drives recorded data onto the magnetic platters longitudinally (ie. longitudinal recording), meaning the bits of information laid flat on the surface. Not only is this more inefficient, it is also has a serious limitation called the superparamagnetic limit.

Perpendicular recording flips the bits on their head, latterly, by aligning the magnetic poles vertically, or perpendicular to the surface of the platter. This reduces the amount of space that they occupy, allowing for much greater data densities than previously possible. This leads to larger hard drives with faster data transfer speeds. Since the width of a bit is smaller, the time required to read it is reduced.

Western Digital VelociRaptor

It's all about speed, speed, speed.

- CONTACT Western Digital
- ONLINE www.wdc.com
- MARKET Everyone
- PRICE $399 RRP

✔ Top-notch performance; interesting design.

✖ Costly for the capacities on offer.

8/10

$399 **300GB**

When I first read the name of Western Digital's high-performance line of hard drives, I immediately thought speed demon. And of course that's what these drives are all about: excellent performance at the expense of capacity and cost-per-gigabyte.

Just looking at the VelociRaptor, you know this isn't a regular hard drive. It is actually a 2.5in hard drive trapped inside a 3.5in body. It's not just any body, either: a black austere heat sink shrouds this little drive to keep it nice and cool as the bits race around at 10,000rpm. Dubbed IcePack, the heatsink reduces drive temperatures, which is good for reliability. It's obvious its main function is to turn it from a 2.5in to a 3.5in drive so that it fits in conventional hard drive bays, but that's okay: it will look special through the perspex window of your massive gaming case.

And a flashy gaming case is the likely destination for many of these performance drives, as it is the gaming crowd who demand the fastest processors, lowest-latency RAM and frame-busting graphics cards to buddy up with a drive like this. All of these top-spec components cost big dollars, so the money needed to outfit your PC with one of these won't be much of a shock.

The good news is the new drives are cheaper than the previous models, while providing considerably more space to boot. The original Raptor drive cost a whopping $499 for 150GB of speedy space, whereas the new drives double the capacity to 300GB, whilst dropping the price to $399. Put that in perspective: you can get the Seagate featured here, with three times the capacity, for a much lower price.

So, while the VelociRaptor is most definitely not the best value on a cost-per-gigabyte, that is not the point of a drive like this. It is all about speed, speed and speed. In this area, the VelociRaptor delivers in spades.

In our testing of the VelociRaptor, we consistently got read speeds of around 107MB/sec: a phenomenal achievement. That is almost 25% faster than the next fastest hard drive in this line-up. Everything about this drive is noticeably snappier than a regular 7,200rpm hard drive.

Gamers will especially appreciate the speed of the VelociRaptor. Load times are reduced, cutting out most of the break that interrupts the gameplay between levels in modern high-end games.

If you are building a high-end PC, and need serious performance from your storage, then the Western Digital VelociRaptor is worth serious consideration.



You get what you pay for: high-end performance for a high-end price.

Seagate 7200.11 1TB

All the space you could ever need in this Barracuda.

CONTACT Seagate
ONLINE www.seagate.com
MARKET Everyone
PRICE $379 RRP

✔ High capacity; sub-$200 retail price.

✖ Not the best value on a dollar-per-gigabyte.

8/10

$379 1TB

The VelociRaptor is what you want if you are after consistently fast performance, but it is not exactly cheap or capacious in a world where 500GB drives are dropping well below the $100 barrier. Sometimes there is no substitute for a single, massive hard drive, and Seagate has come to the party offering a staggering 1,000GB. That's right, eight trillion ones and zeroes in a package the size of a paperback. But with 1,000GB you can store a heck of a lot more than a book. Vast libraries of music, movies, television shows and photos will find themselves at home on a drive like with 1TB.

Previously we reviewed the Western Digital WD1000FYPS, a 1-terabyte member of WD's GreenPower line-up of efficient hard drives designed to be cool, quiet and to save the planet, and it was a bit of a mixed bag. It did remain cool and quiet, but it did so by sacrificing performance, and wearing a hefty $439 price-tag.

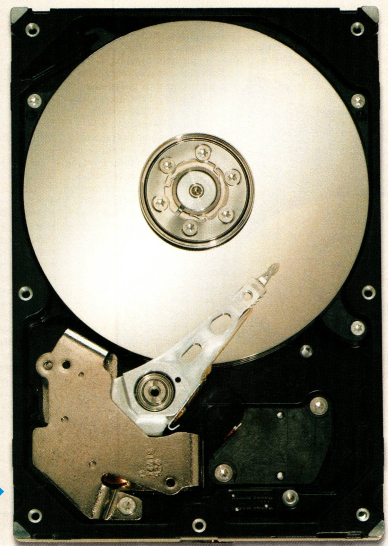
On the street however, the Western Digital can be picked up for around half that, but the Seagate manages to break through the $200 barrier at some stores. While still slightly more pricey than two 500GB hard drives, a single drive can be a lot more practical.

At this price range, filling up a PC with several of these becomes a relatively cheap proposition. About a year ago now I built myself a media server with four 400GB hard drives, totalling 1.6TB at a cost of just over $200 each. For the same money now, using the Seagate's, I'd have four terabytes — in other words, a whole lotta storage! For under $1,000 you could have a PC serving up 4TB of media to computers across your house!

The Barracuda line-up continues the Seagate tradition of naming the drive by speed then series, making this the 7200.11. 7,200rpm is standard in desktop hard drives these days, but the performance of drives can differ considerably (as evidenced by the Western Digital GreenPower 1TB drive). While the Barracuda isn't designed for uber-performance, a bit of speed doesn't hurt, especially when you have this much space to fill.

In benchmarking, the Seagate came out ahead of the Western Digital GreenPower with average read speeds of 86.1MB/sec, 17MB/s faster. Speeds topped out at 122.4MB/sec, but users are unlikely to see that in normal use.

The Seagate Barracuda represents great value in the terabyte storage market. While it is still more expensive on a dollars-per-gigabyte basis, it would be very suitable for high-volume storage users who need as much space as they can get their hands on.



Maxi-storage at a decent price: the Barracuda 1TB.

Seagate 7200.9 250GB

So... what if you just want a good, basic hard drive?

- CONTACT Seagate
- ONLINE www.seagate.com
- MARKET Everyone
- PRICE $179 RRP

✔ Low price point; perfect for basic computer users.

✖ Noisy when transferring large amounts of data.

7/10

$179 **250GB**

All the other drives in this line-up have a specific feature that would make you want to buy them. The VelociRaptor is seriously quick, the Seagate has an enormous amount of storage, and the Scorpio Black combines the two for a capacious, speedy notebook drive.

But what if none of this is important to you? There are many users out there who don't have needs like that; all they want is a computer to surf the web and send a few emails. If you're building a PC for your grandmother who wants to get on the net, they won't need quad-core power and fast hard drives; all they need is something cheap. There are plenty to choose from, with most being either 160GB or 250GB at 7,200rpm — more than enough storage for a basic user.

Seagate's Barracuda 7200.9 line of drives has been around for a while now, making them excellent value for the buyer on a budget. Available in sizes from 40GB right up to 500GB, there is a model for everyone.

Seagate sent a 250GB SATA model for review, and performance was as expected: not great. With benched transfer speeds averaging 57.7MB/s, it will not be rushed into anything. Performance-seekers best look elsewhere.

Despite Seagate's claim that the "SoftSonic motor enables whisper-quiet operation", I found the drive to be quite noisy when under pressure. If you are running Windows Vista with file indexing enabled, things could get a tad loud at start-up. When not busying the drive with hefty file transfers and benchmarking, it was reasonably quiet and unobtrusive.

The performance figures and noise levels won't be of much concern for the basic user, nor those who are looking to build a cheap external drive. Once you try and funnel data to a desktop drive through a USB port, everything slows down, and suddenly a speedy drive isn't essential. An external USB case for 3.5in drives can be picked up for under $20, and paired up with one of these can make for a cheap alternative to a pre-assembled model.

Poking around on the internet, I found the 16uGB SATA version of this drive for the bargain-basement price of $52, with the 250GB model demanding only $7 more.

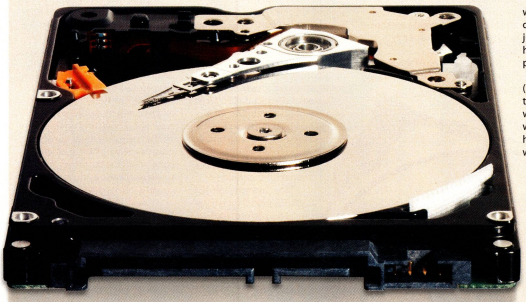
With an increasing emphasis on cheap PCs, the market for budget hard drives is bigger than ever. Seagate's trusty Barracuda 7200.9 is an excellent choice for people building a PC on a budget, or looking to make a cheap external hard drive.



No frills, but excellent value for the basic user: the 7200.9.

Western Digital Scorpio Black 320GB Notebook

Want to have your cake and eat it too?



CONTACT Western Digital
ONLINE www.wdc.com
MARKET Everyone
PRICE $319 RRP

✔ Capacity; performance; pricing.

✖ None.

9/10

$319 320GB

Notebook hard drives have always been behind their desktop counterparts when it comes to capacity. That's to be expected since they are considerably smaller. Not only do they have lower capacities, they are often slower than even the most basic desktop drive. Many laptops still ship with 4,200rpm drives, although that is changing, with 5,400rpm becoming increasingly commonplace.

Despite this, 7,200rpm notebook drives still haven't become mainstream, and are often only found in performance machines. Typically, the issue with having a 7,200rpm drive in your laptop is you must sacrifice capacity. For many who use them, like mobile gamers, that isn't much of an issue, but what if you need both the performance of a 7,200rpm drive, but the capacity of a slower 5,400rpm one?

Enter the Scorpio Black, a new line of drives from Western Digital designed to address this performance-seeking, gigabyte-munching market. With the tag-line 'Desktop-class performance for notebook computers', it is obvious who this drive is aimed at.

The Scorpio Black line-up consists of capacities ranging from 80GB up to 320GB, an impressive feet. Up until now, 200GB and 7,200rpm were top of the game in the notebook hard drive market, which can be a bit of a problem when working with files that can balloon to enormous sizes.

Like many Western Digital drives, a host of technologies have been incorporated to ensure the security and integrity of your data isn't compromised by the rigours of movement. The Scorpio Black series incorporate Western Digital's IntelliSeek technology, to smooth the movement of the heads across the drive. Instead of racing across the platter only to wait while the requested piece of data spins around, the heads arrive just at the right time, without having to stop. This also decreases power consumption.

To increase durability and MTF (Mean Time to Failure), SecurePark takes the heads off the platters when the drives spins up, down or when it is off, to make sure the heads don't damage the drive when not in use.

WhisperDrive (you've got to love these names) aims to keep the drive quiet during seeking and writing operations, and as such they claim it as one of the quietest drives on the market today. We did find the drive to be quiet and unobtrusive under normal usage situations.

Now for the Black's party piece — speed. Notebook hard drives just aren't as fast as desktop ones; it's an unavoidable fact. That doesn't mean you have to settle for the run-of-the-mill speeds most drives offer. While 7200rpm 2.5in drives are quite common these days, they still lag well behind desktops. The Scorpio Black we tested yielded speeds averaging 67.9MB/s, a far cry from what a desktop drive is capable of, but on the notebook landscape it is quite an impressive result. A Western Digital 250GB 5,400rpm 2.5in SATA drive only saw an average of 44.6MB/s, making the Black over 50% faster.

As notebook sales eclipse desktop sales, it's becoming ever more important for manufacturers to shoehorn increased performance and capabilities into the confines of a notebook chassis. While the Western Digital Scorpio Black can't compete with its desktop brethren in the performance stakes, it is a boost for notebooks.

My Passport Studio 320GB

Running out of space on your Mac laptop?

- CONTACT Western Digital
- ONLINE www.wdc.com
- MARKET Mac users
- PRICE $279 RRP

✔ FireWire interface; Mac styling; competitive price.

✖ Despite looking metal, it's plastic.

7/10

$279 **320GB**

MacBook Pro owners are not easily accommodated for when it comes to upgrading their notebook storage. Dell notebooks make it very easy on many models, with a slide-out tray housing the hard drive, taking just minutes to replace. Even the regular MacBook makes upgrades easy, with a panel inside the battery compartment.

To access the drive in the MacBook Pro, the top half of the base of the notebook has to come off, along with delicate ribbon cables, some of which are glued down very tightly. One slip or misapplication of force could damage your machine. If you do, you'll likely have invalidated your warranty as well.

The other alternative of course is an external solution. You then have two options: 2.5in or 3.5in? On the plus side, USB external drives based on 3.5in HDDs are cheaper and are available in larger capacities, but you will end up with a large, bulky drive that requires a similarly large power brick, severely limiting your mobility.

For working away from the wall, a USB external drive based on a 2.5in HDD is a better option, as your notebook's USB ports can power them. The vast majority of the brand-name 2.5in external drives and cases available only offer USB connectivity, but Western Digital has recognised there is a market for FireWire versions of these drives, and they are aiming them right at Mac users.

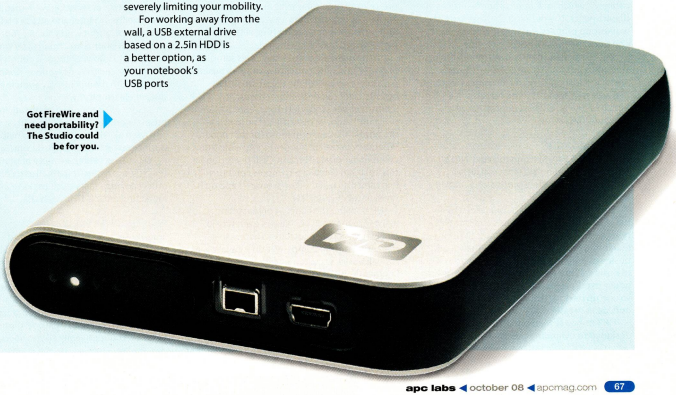
The new drives, called the My Passport Studio, are identical in design to the My Passport Elite drives, with the addition of a 4-pin FireWire connector the only external difference between them. In keeping with the Mac market, the Studio is only available in silver, matching up very nicely with a MacBook Pro.

The 4-pin FireWire connector instantly introduces a problem: how will the drive be powered? Unlike the larger 6-pin connector, 4-pin does not provide power, requiring Western Digital to come up with a neat solution. The FireWire cable has a 6-pin FireWire connector on one end, and both 4-pin FireWire and a Mini-USB connector to provide both data and power. It works very well, but don't lose the cable, as you'll be very unlikely to find one at your local computer shop.

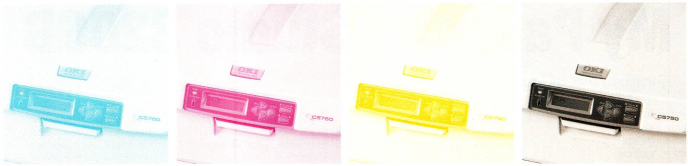
Beneath the silver exterior lies your choice of 160GB, 250GB or 320GB drives, effectively doubling the portable capacity of the majority of MacBook Pro owners.

Performance isn't earth-shattering, but it is interesting to compare the speeds of the FireWire and USB interfaces. Using a USB cable, transfer speeds averaged 31.0MB/s. Switching to FireWire 400, that increased to 37.7MB/s, or about 20%. While that may not be a particularly large boost, it would knock considerable time off a Time Machine backup, or large file transfers.

If you are running out of space on your Mac laptop but aren't game to crack it open to upgrade your hard drive, then the Western Digital My Passport Studio is the perfect solution, with no AC adaptors required.



Got FireWire and need portability? The Studio could be for you.



SMB printers

BUYER'S GUIDE

Printer vendors are pitching printers specifically at small business. So, what do you look for in a small business printer?

Until recently, there was nothing especially 'small business' about many printers that were sold to small business users. Small businesses would buy the kinds of printers generally targeted at the workgroup category, which included corporate offices or departments. The defining characteristic of workgroup printers was that their duty cycles and print speed matched their usage volume.

But that's now changing. As more vendors start to target small business directly, they are including uniquely small business features. *APC* assessed some of these features in a bunch of newly released printers targeting small businesses.

MARKETING HELP

Printer makers are starting to value-add by bundling marketing aids that will help a small business produce professional-looking marketing collateral.

For its latest range of colour lasers, HP has introduced software, tools and samples designed to assist a small business to print marketing materials. HP believes that small businesses want to print everything from logos to business cards (but often don't have the in-house expertise to achieve professional results, so end up having the collateral produced outside at greater cost).

HP's In-house Marketing Starter Kit is designed to overcome this. HP South Pacific's head of business printers, Max Kaye, says: "Inside the box is software, paper samples and some pamphlets and things to assist companies to do their own in-house marketing. We understand that while a lot of people use pre-printed brochures in large volumes, there are a lot of organisations that want to print quite small-volume but high-quality very personalised marketing material."

In the marketing kit, HP includes samples of glossy brochure paper to give small business customers an idea of the paper stock they need to print out decent brochures. "It's 225gsm paper, which lets you create big, shiny brochures, and we have put settings inside the printer that are optimised for that paper. What they generate is indistinguishable from commercial-quality output. So it gives people this ability to create a big impression but still do it in their office in their own time — and do it on their sub-$2,000 laser."

HP is taking the concept of marketing assistance for small businesses even further by giving its printer customers access to a marketing design company it bought last year. A small business customer can log in to the Logoworks web site and purchase a design package in which Logoworks will create logos and other marketing material.

Kaye says: "Maybe the small business doesn't have the logos, business cards, stationery, web site or image management stuff. Purchase of a Logoworks design package entitles you to brief an actual, real (live) designer. You can buy a package where they will build you a whole set of company logos, including business cards stationery, letterheads... in short, all your image creation. You give them a brief and attach a whole lot of information about who you are, your company, and digital photos and things you want to incorporate into your logo. Through HP you get introduced to Logoworks — then deal directly with them. They give you their output electronically."

In fact, HP is trying to create an entire small business printing ecosystem, with staff blogs and even a web site designed to help small businesses, at **http://tinyurl.com/5p6zv9**.

OKI also provides a variety of print solutions that suit everyone from retail and corporate offices to hospitality businesses — and features marketing advice on its web site.

PROFESSIONAL PRINT QUALITY

Small businesses want their printed material to look like it was produced by a print bureau. Print quality is a combination of the printer's resolution, ink technology and the paper being used. Most printers have a native resolution of at least 600 x 600dpi, which is enough to deliver good-quality business documents, while a resolution of 1,200 x 1,200dpi is really all you need for the



Print management software enables a small business to monitor printers (and their usage) on the network, to help keep costs down.

reproduction of the finest detail in graphics.

But the real action is in colour technology — both in laser and inkjet printers.

Canon has introduced to its new PIXMA all-in-one printer range its 'PgR technology'. The PgR system is unique to Canon, coating the paper with a transparent ink layer before the other colours are applied — enabling higher quality on plain paper. Not to be outdone, HP has introduced a newly formulated 'ColorSphere' toner for its latest colour LaserJets, which it claims leads to better colour reproduction.

One of OKI's strengths has always been its colour reproduction, and this theme continues in the latest range of C5000 colour printers. The prominence of colour in OKI's marketing comes from the fact that OKI is the only major printer maker to base its printers on LED rather than laser technology, which enables it to claim some distinct colour benefits. LED printers use print heads that have no moving parts and can deliver super-fine inks. The printers also feature OKI's ProQ system, which reproduces colour gradation at the engine level.

EASY PRINTER MANAGEMENT

A small business needs to monitor its costs closely — and few costs can blow out more than those of a colour printer on a network that is being used by staff for everything from printing personal photos to lots of black-and-white documents. Print management software enables a small business to monitor printers on its network, their usage statistics, consumables use and so on. Lots of third-party software provides printer management, but small business printers are starting to come with sophisticated management software provided by the vendor. For its laser printers, HP includes Print View Software. This allows you to view print jobs in advance and estimate the document costs, in order to avoid unanticipated costs and reprints.

WIRELESS FEATURES

Wireless printers means a small business doesn't have to worry about network cables. HP and Lexmark are heavily promoting this feature in their latest products. For Lexmark, wireless printing is one of the key selling points of a new range of multifunction units (the X4875, X6575, and X9575 printers) targeting small businesses. Lexmark Australia's marketing manager, Stephen Bell, says: "We have a really strong focus on wireless. Wireless brings that ability to create a networked environment where you don't have a large amount of cabling. With the proliferation of notebooks and desktops (PC and Mac), Wi-Fi can now connect them easily to the printer or multifunction."

FIRST-PAGE PRINTING SPEED

This is rarely a major consideration in a small business printer purchase, yet it's probably more important than overall print speed if the business prints lots of small documents. A printer with a long first-page printing time is going to churn through significantly less prints than one which is quicker to get that first page out. The first page speed will vary depending on whether the printer is ready or in sleep mode. Whereas with older printers it used to take over half a minute for a printer to churn out the first page from sleep mode, the reaction time has dropped dramatically with the latest small biz-oriented printers. The HP Color LaserJet CP3505dn does it in 17 seconds from sleep mode or in 12.5 seconds from ready mode. In its new mono lasers, Canon has a so-called 'On-Demand Fixing System' that claims to deliver the first print in less than 6.5 seconds from sleep mode.

PRINT SPEED

Print speed (pages per minute, or ppm) is important for a small business printer, but it's also the one statistic that you must take with a grain of salt when reading the vendors' specs. Manufacturers' print speed mostly refers to the printer engine's speed in a utopian world of easy-to-print files. Files with complex graphics or fancy fonts will slow the printing speed down,

SMB printers



Print speed: what you need depends on the size of the business.

and here the speed of the printer's processor is just as important as the engine print speed. In *APC* testing, printers rarely exceed 75-80% of the speed claimed by the vendors. There are exceptions. *APC* printer reviewer Stephen Withers was shocked when, in a recent review, an OKI printer actually met its claimed print speed.

The speed you need depends on the size of the business. A small office can get away with a printer with a print speed of 12ppm, but a larger business or workgroup will need at least 20ppm.

So — what kind of results are the latest printer releases achieving?

When it comes to black-and-white, you can now get some astonishing speeds for the price. Canon's new LASER SHOT mono lasers are fast, with the $649 LBP 3370 and $399 LBP 3310 delivering about 26ppm, while the $199 LBP 3250 does 23ppm — all using what Canon calls its new 'high-speed CAPT 3.0' technology.

Speeds are also accelerating for colour. HP's $2,299 Color LaserJet CP3505dn does 22ppm in colour or black-and-white. The $499 Color LaserJet CP1518ni does 8ppm colour and 12ppm in mono.

Pushing the speed/price envelope is OKI's C5000 range of colour LED printers. For instance, OKI's C5850 A4 colour printer (which retails for around $1,500) offers 32ppm mono and 26ppm colour.

DUPLEX PRINTING

Duplex printing (ie. printing on both sides of the paper) can lead to massive savings in paper costs, so this is a feature now found in most small business printers. What's important is that the printer should be able to print on both sides of the paper without the user having to reload the paper, so a duplex paper feeder is a must.

MONTHLY DUTY CYCLE

The major decision when selecting a printer is how many pages it needs to print each month. Once you've figured this out, look at the printer's duty cycle or monthly page volume, which is the printer manufacturer's estimate for the maximum number of pages the printer can print without being expected to break down. A printer with a 5,000-page duty cycle per month can theoretically print out 10,000 pages, but it could break in the process.

Low-cost entry-level printers tend to start with duty cycles of around 5,000 pages per month. But a small business printer should start at 10,000 (the new Canon LBP 3370 has a duty cycle of 15,000 pages), while larger small business printers should range between 30,000 and 60,000 pages per month. The OKI C5850 is at the top end, with a 60,000 page duty cycle.

INPUT TRAYS

In a typical small business, you will need to print a variety of material, not just A4 documents, so a printer should have a large-enough main paper tray and the ability to add an extra tray, so that the second tray can carry letterheads, envelopes, labels, DVD sleeves or even transparencies.

On most entry-level printers, the main paper tray can take between 150 and 250 paper sheets at once, which is fine for a small office, but probably too little for a real office environment. The HP Color LaserJet CP1518ni fits into this category, with a 150-sheet input tray, although it can have another tray added. Up a notch is the Canon LBP 3370, which has a 250-sheet main tray and 50-sheet multi-purpose one (and an optional 250-sheet cassette).

Printers targeting mid-level small businesses tend to take between 500 and 1,000 sheets in their main trays. The HP Color LaserJet CP3505dn has a tray that accommodates up to 850 pages, with an optional 500-sheet tray.

TALLYING THE COST

This is where a lot of small business printer buyers go wrong, purchasing a printer based on the price of the printer equipment, rather than on its long-term running costs. It's the latter where printer manufacturers make their profit, so it's critical you assess what it will cost to run the printer based on paper, toner and maintenance costs.

A simple way of estimating the ongoing cost of a printer is to estimate the number of pages you might print over a year. Then work out the cost per page by dividing the number of pages produced by the print cartridge by the cost of the cartridge and multiply the two. Then add the cost of the printer to get your overall cost. This is where you'll be able to compare the true cost of a cheap printer (with expensive consumables) with that of an expensive laser (with cheaper consumables).



dramatically superior colour

new
C5650 | C5750 | C5850 | C5950

The new C5000 Series is even better than before!

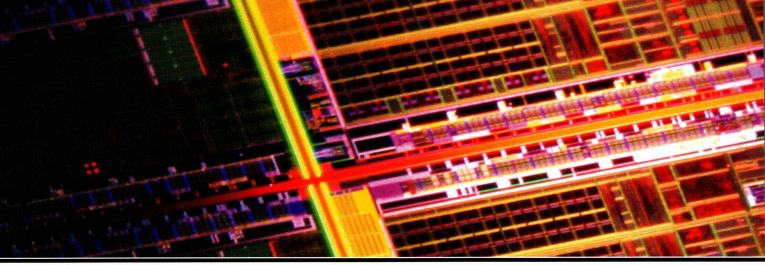
Faster speed, higher quality and even better value.

Combined with extensive paper handling and outstanding media flexibility, the **new C5000 series** offers the complete solution for medium to large workgroups or small business users who want a versatile and a more cost-effective means of creating **high-impact** professional business documents from business cards right up to **1.2m banners**.

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PRINTING SOLUTIONS



THE NEW Parallel Universe

Multi-core processors offer great potential, but does the reality live up to the hype? *Mike Bedford* investigates the growing trend in multi-threaded computing.

For years, scientists have enjoyed the benefits of supercomputers that contain thousands of processors each working in parallel to achieve phenomenal levels of performance. The advent of multi-core processors means that these advantages are on offer to ordinary computer users, but unlike earlier computing design improvements, the gains available from working in parallel are not guaranteed.

Employing multi-threading software makes the parallel promise translate into reality, and when these gains are realised, their potential is nothing short of staggering. Today, power users have quad-core CPUs in their PCs; but Intel has already demonstrated an 80-core chip and experts are suggesting that future processors will contain hundreds of cores. Here we look at multi-core technology, the multi-threading software, the gains on offer and what the future could hold.

According to most pundits, the Megahertz Wars that dominated the world of CPUs for over 20 years are now well and truly over. They had a good run, and the increases in performance were truly dramatic, with figures doubling every couple of years from 4.77MHz in 1981 to 3GHz in 2002. However, since that 3GHz milestone was reached, clockspeeds have only crept forward. One of the reasons for this relates to power consumption and the consequential requirement for ever more advanced forms of cooling.

The power consumption of a microprocessor is directly proportional to the clockspeed, so — all other things being equal — doubling the clockspeed should cause a doubling of the power consumption. Another way of approximately doubling the performance is to keep the clockspeed constant but double the number of cores. However, this will also double the power because there will be twice as many transistors. This brings into question the opinion that the multi-core approach is the frugal option. The fact is that doubling the clockspeed only doubles the power consumption if all other things stay the same — and, it's pretty certain that they won't. The higher clockspeed requires a higher core voltage and the power consumption increases with the square of the voltage. This means that doubling the power by increasing clockspeed results in a more power-hungry chip than if the cores were doubled.

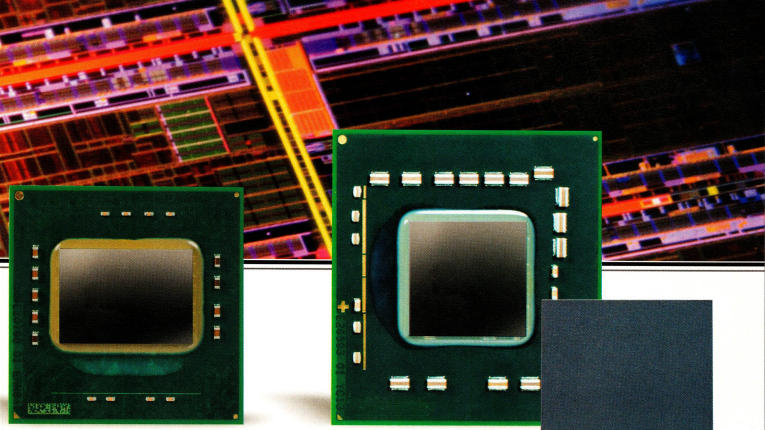
So if multiple cores are the way to go, it's not surprising that manufacturers are queuing up to release chips with ever more cores. Most PC users now consider processors with two cores as entry-level, and those with triple- and quad-core chips are being touted for those users with power-hungry applications who want a little more out of their computer.

Some companies are already selling products that use chips with a higher number of cores, although they are less mainstream. Sun Microsystems uses an eight-core UltraSPARC T2 processor in its latest servers, and some companies have chips with hundreds of cores that are aimed at specialised applications such as mobile phones. The PC market isn't getting left behind, though: both Intel and AMD are expected to have eight-cores in the near future; and Intel has even more ambitious plans.

APPROACHES TO PARALLELISM

Multi-core might be the buzz-phrase of the moment, but this certainly doesn't represent the industry's first step into parallel computation — far from it. The multi-core approach is just the latest method in a long line of techniques aiming to do more than one thing at once.

For many years, processors performed one operation per clock cycle. So a processor with a clockspeed of 1MHz was able to perform



THE MEGAHERTZ WARS THAT DOMINATED THE WORLD OF CPUS FOR OVER 20 YEARS ARE NOW WELL AND TRULY OVER

one million operations per second. However, as processors became more sophisticated, instructions took more than a single clock cycle to execute and this relationship broke down. Those instructions might have done the work of lots of the simpler instructions — and certainly clockspeeds increased dramatically — but there was a time when this had to be balanced against the fact that instructions were executed over many clock cycles.

The move back to single-cycle instructions was the result of a technique called 'pipelining', which represented the computing industry's first faltering steps into parallelism. Executing an instruction is a multi-step process. At its simplest stage, it might involve decoding the instruction, loading from memory the data for it to work on, performing the necessary action on that data and finally writing the results back to memory. Each of these steps could take a clock cycle. Pipelining involves separating these steps and performing them in parallel. It isn't possible to perform all those steps in parallel for a single instruction, but as soon as one instruction has been decoded, the decoder is free to start decoding the next instruction at the same time as the data is being loaded for the first instruction. Pipelining doesn't quite give us single clock cycle instructions — mainly because the pipeline has to be flushed each time the program branches — but it comes close.

The next development in parallelism was the provision of multiple execution units in processors. A chip might have two arithmetic/logic units (which perform integer arithmetic and logical operations) and two floating point units (which perform arithmetic on floating point numbers). When used alongside pipelining, the multiple execution units permitted — for the first time — more than one instruction to be executed in a clock cycle. However, the improvements aren't as dramatic as you might expect. For a start, it often isn't possible to work on two consecutive instructions in parallel because the second of the two might require the result of the first. And secondly, executing multiple instructions in parallel might involve guessing whether or not a branch will be taken. If that guess proves to be wrong, the result of one of the parallel instructions has to be discarded. A final point is that if only the arithmetic/logic and floating point units are duplicated, there is still contention for other resources within the processor.

MULTI-THREADED OPTIMISATION

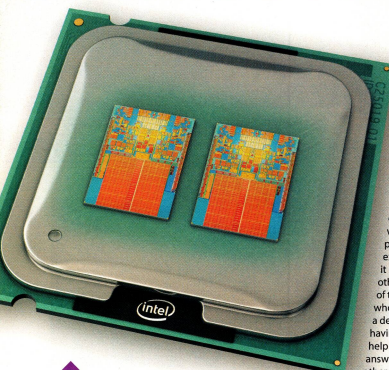
All of the approaches to parallelism described above have one common factor. The parallel resources are managed within the processor, which means that they are transparent to both the operating system and application software. In other words, if you'd swapped from a processor without pipelining to one that supports it, or if you'd upgraded from a pipelined processor with one arithmetic/logic unit to one with two, you'd have seen an immediate performance increase with the same software. Sadly, this does not happen with multi-core processors; as some industry experts have commented, there's no longer such a thing as a free lunch. For the first time, parallel resources will only work with specially written software that employs a technique called 'multi-threading'.

At its simplest, a thread can be an application. In this case, all you need to make use of multi-core processors is an operating system that supports multi-threading. Happily, all versions of Windows since XP have this support. Now you can run two programs at once without them competing for the resources of a single core. This helps if you want to run a power-hungry application in the background — such as rendering — without the foreground task being affected; but it doesn't help if you want that power-hungry application to run faster. To achieve that, the application itself has to support multi-threading. This involves splitting up the operation of the code into logical tasks that can be performed independently and in parallel. We'll investigate this issue in quite a bit more detail later on.

THE GAINS ON OFFER

The idea that going from one to two or two to four cores will double the performance of a chip is, sadly, naive. So what performance gains can we reasonably expect in the real world? We asked James Reinders, Director of Marketing

THE NEW Parallel Universe



According to Intel, a three-fold speed-up is pretty good for a quad-core processor.

and Business Development for Intel's Software Development Products, what he expected to happen. "Some programs scale well," he told us, "and may see gains close to the number of cores. Occasionally, this might mean a four-fold speed increase on four cores, but even a three-fold increase on four cores is good. Anything which has reasonably independent work to do can see such speed-ups, for instance database queries. But we will not see doubling cores make a system twice as fast in general."

So why does each additional core give less advantage than the previous one? "Eventually, the overhead of distributing work catches up to any program," Reinders explained. "For some it might be a few cores, others it might be tens of thousands. For anyone who has been up against a deadline, you know that having someone offer to help can sometimes be the answer to your prayers, and other times be simply of no use at all. Sometimes the overhead of breaking down short term work can be more trouble than it is worth. On the other hand, the more work there is to do, the more likely it is that you can use the help."

Reinders also had a cautionary tale to tell about how all this extra power might end up being used. "I used to have a 40MHz processor in my laptop; now I have one with a processor running at over 2GHz. Is that fifty times as fast? Not really, and the speed boosts it does have are used for many things other than running a single application faster such as smooth scrolling, higher resolution screens with more colours, wireless connectivity and virus checkers. The extra power is used more for things that I didn't have before, than for making my old applications faster. We will see history repeat itself with multi-core processors."

AMD's Chuck Moore, Senior Fellow Design Engineer for Accelerated Computing, was even more realistic. "An important aspect is something called Amdahl's Law. While not widely known outside the silicon design engineering and software development communities, it's highly relevant to the parallel processing and programming issue." Amdahl's Law is a formula for working out the performance gain of a parallel system. If all of the workload can be parallelised, the speed-up is equal to the number of processors. However, if even a small percentage of the program can't be run in parallel, the level of improvement drops dramatically. For example, if five per cent of a program can't be parallelised, the performance gain is limited to 20 times — no matter how many cores are used.

However, these restrictions only apply to homogeneous cores, a standard which could be replaced in the near future. "AMD is now focusing heavily on bringing heterogeneous multi-core solutions to market, as part of our Accelerated Computing initiative," Moore told me. "The title Accelerated Computing comes from the idea that in the future, AMD and the industry plan to increasingly produce microprocessor designs that combine varying mixtures of scalar processing cores, parallel processing cores, and

SINGLE-CORE MULTI-THREADING

Hyper-threading technology gives processors a 30 per cent gain in speed.

Multi-threading software is essential to take advantage of multiple cores, but that's not all it's good for. It provided performance gains before multi-core processors came on the scene, thanks to hyper-threading technology.

A processor with hyper-threading can achieve a speed improvement of up to 30 per cent by executing multi-threading software, even though it only has a single core.

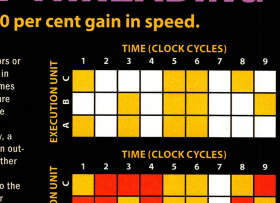
And, in today's multi-core processors, it means that a chip can execute more threads than it has cores.

The secret behind this apparently contradictory state of affairs is to duplicate the parts of the processor that store its architectural state — the address of the instruction being executed, the contents of its registers, its status flags and so on — without duplicating the circuitry that actually executes instructions.

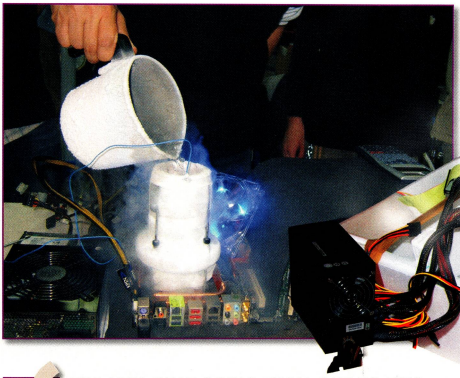
This makes the processor appear to the operating system as two separate processors or cores, allowing two threads to be executed in parallel. The benefit of this approach becomes obvious when some of the execution units are not used by the current thread and when the processor's pipeline is stalled because the required instruction is not in cache memory, a branch has been predicted incorrectly, or an out-of-order instruction needs the result of another instruction that has been executed.

Under these circumstances, switching to the other thread allows those unused processor resources to be pressed into service.

It has been estimated that the cost of implementing hyper-threading is just a five per cent increase in the silicon area – a worthwhile investment for what amounts to a 30 per cent improvement in speed.



A single-threaded core often has idle resources (top). Hyper-threading allows idle resources to be used by another thread (bottom).



> THE IDEA THAT GOING FROM ONE TO TWO OR TWO TO FOUR CORES WILL DOUBLE THE PERFORMANCE OF A CHIP IS, SADLY, NAIVE

Overclockers know that high clockspeeds require serious cooling. Multiple cores will provide less power-hungry computing.

fixed-function accelerators on-chip. AMD calls this new category of processor an Accelerated Processing Unit (APU). By creating the optimum mix of these three types of blocks, an APU can be more highly tailored to accelerate the software that matters most to a particular end user. AMD's first APU will be 'Swift', which is targeted at the notebook space. This APU combines x86 scalar processing cores, a parallel processing core (based on ATi GPU tech) and a universal video decoder (again based on ATi tech) on-chip."

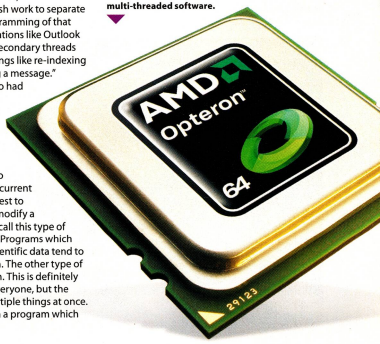
MULTI-THREADING SOFTWARE

Certain types of software are more likely to benefit from the multi-core approach than others. So what applications will benefit the most from the new approach, and which already available software can take advantage of an increase in the number of cores?

We asked Mike Taulty, Developer Evangelist at Microsoft UK, what types of applications are multi-threaded today (and received a somewhat unexpected answer). "On a Windows machine, it would be easier to list applications that are not multi-threaded. Most applications are multi-threaded," he told us. This is rather surprising. An application like Word, for example, spends most of its time waiting for a key depression — so there would seem to be no great imperative to use multi-threading. We put this point to Taulty, and asked whether in this case, multi-threading is used as a programming convenience rather than for performance gains. "Yes," he answered. "Client applications often push work to separate threads to partition the programming of that work. However, client applications like Outlook or Word might make use of secondary threads so that they can be doing things like re-indexing your mail while you're typing a message."

Intel's James Reinders also had some ideas about which applications will most lend themselves to multi-threading on multi-core processors. "Any program which processes a lot of data is generally quite easy to optimise for parallelism. Concurrent processing of data is the easiest to find, and it's usually easy to modify a program to achieve this. We call this type of parallelism data-parallelism. Programs which process photos, videos or scientific data tend to exploit their data-parallelism. The other type of parallelism is task-parallelism. This is definitely harder to grasp for almost everyone, but the concept is simple: doing multiple things at once. But figuring out the things in a program which

Multiple cores will only provide more speed when used with multi-threaded software.

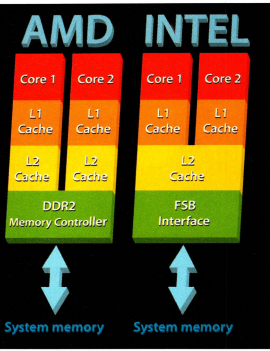


INTEL vs AMD

We investigate the pros and cons of different multi-core architectures.

Doubling up on the number of cores doesn't mean doubling up every part of a microprocessor; certain elements are commonly shared between cores. The architecture for multi-core microprocessors is not yet standard, and, in the case of cache memory, there are a couple of different approaches — each with advantages and disadvantages. Level 1 (L1) cache is closely tied to the core, which invariably means that each core has its own L1 cache. The architectural difference is to do with Level 2 cache. AMD's Athlon Dual-Core has independent caches — one per core — whereas Intel's Core 2 Duo has a single L2 cache that is shared between the cores.

At first glance, independent L2 caches would seem to be the clear winner because it means that there's no contention between cores — each can access cache at any time without having to wait for the other core to release it. However, a shared L2 cache also has its benefits. Firstly, it copes well when the cores have mismatched workloads; the hard-working core can have the lion's share of the cache. Other advantages are that a single-threaded application can use the entire cache instead of only 50 per cent (as would be the case in an independent cache microprocessor) and that a shared cache allows quick and easy sharing of data between cores.



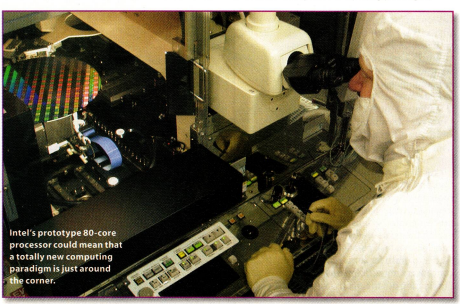
AMD's Dual-Core Athlon has independent L2 caches, whereas Intel's Core 2 Duo shares L2 cache.

can be done at the same time eludes people all the time."

AMD might have part of the solution. "The need for better parallel programming techniques is real and increasing," Chuck Moore explains. "AMD clearly understands and is taking action to solve the challenges of programming for parallelism. Of equal and growing importance, AMD is also working collaboratively with the software community to develop better tools for programming within both homogenous and heterogeneous processing environments as part of our Accelerated Computing initiative. We look forward to these methods becoming part of a cross-industry, standards-based approach to overcoming the challenges and achieving the full potential of parallel processing."

A NEW COMPUTING PARADIGM

Last year, Intel demonstrated an 80-core chip that was capable of exchanging data at a speed of one terabyte a second. The company hopes to have these chips ready for commercial production within five years. Industry experts have suggested that chips like these will produce a totally new computing paradigm.



Intel's prototype 80-core processor could mean that a totally new computing paradigm is just around the corner.

We asked Intel's James Reinders whether he agreed with this view. "Yes, I'm a huge believer that large numbers of cores will change many things. Mainframes, mini-computers, personal computers — more performance has always brought new computing paradigms. For me, I can't understand why anyone would think what we have today is 'good enough' and will be all there is in the future!"

So what is this new paradigm? What new ways will people be using computers in the future thanks to the multi-core revolution? "It takes a little imagination to envision the future. It always has," Reinders commented. "My imagination has thoughts on how it will work out. I tend to think of five things. First, speculation — the computer does things it thinks I will want, so it's ready when I actually ask for it. Second, modelling — the computer models the world it resides in, and adapts better to it. A far too simple example is having my computer default to 'USA' when I'm using it in the USA; a more sophisticated model is having it learn my face and notice it in photos, videos, etc. Why can a five year old do this so well, but no computer seems to even try to do it? Third, virtual reality at a level far beyond what we experience today; making that commonplace, replacing current computer graphics as completely as the VGA/CGA replaced the original monochrome text displays. Fourth, speech recognition. And lastly, eliminating the wait-cursor (the Windows hourglass). I'm sure they will turn out to be only part of what happens, and many days I worry that wait-cursors are as inevitable as death and taxes. We'll see." PCPC

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Visual computing evolves

Historically, graphics rendering wasn't something that Intel worried about, but it's now forming the basis of a new direction in chip design.

High-performance graphics has always been one of the most exciting yet niche aspects of PC technology. With the development of a new co-processor architecture designed to accelerate graphics rendering, Intel is signalling a major shift in its CPU design strategy in favour of visual computing.

The Larrabee processor, Intel's first massively multi-core chip, won't just shake up the graphics industry. It also gives a glimpse of a future of highly parallelised computing hardware and applications. At it's simplest, visual computing for Intel means a new co-processor architecture designed with graphics in mind.

NEW ARCHITECTURE

Visual computing overlaps with another major R&D effort at Intel, the terascale project. Terascale entails a shift in focus from sequential to parallel processing and the development of massively multi-core processors. In fact, the Larrabee chip is essentially Intel's first terascale chip.

However, if Larrabee is also the first iteration of a chip designed for visual computing, what will it be used for beyond the field of conventional 3D graphics? Well, CPU and GPU architectures appear to be in the process of converging. With the unified shader architecture that arrived with DirectX 10 in early 2007, GPUs are now more flexible and exploitable than ever.

Combine that flexibility with the ever-increasing parallelism that has always been a part of GPU design and the result is colossal raw power. It's claimed that AMD's most powerful GPU, the Radeon HD 4870, can crank out no less than 1.2 teraflops — which is orders of magnitude in front of even Intel's fastest quad-core CPUs. Nvidia's top chip is not far behind.

SHIFTING GROUND

That's a dangerous place for Intel to be, because both AMD and Nvidia are widely promoting the so-called general-purpose capabilities of their GPUs. If Nvidia in particular is to be believed, the next 12 months will see general-purpose GPU (GPGPU) applications and plug-ins appear on the market with increasing frequency.

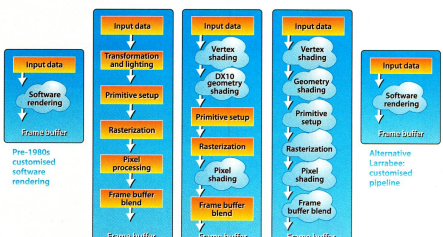
If the reality is anywhere near the hype, the whole dynamic between CPUs and GPUs will change. Who needs a high-end quad-core chip when you can accelerate many of your favourite and most resource-intensive applications by using a GPU?

THE NEW BREED

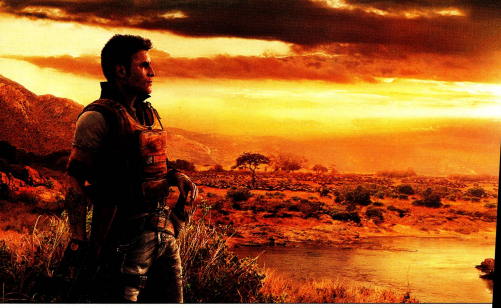
Enter, therefore, Larrabee. Pitched as a conventional graphics board, it's also a defensive play designed to parry the threat from GPGPUs. And it might just be a hedge against the possibility that highly parallel chips that major on floating-point power will eventually usurp CPUs altogether.

Intel provided *APC* with exclusive access to pick the mighty brains of Doug Carmean, the Chief Architect overseeing the new chip. Intel has already released some information about the mysterious chip's innards. We know, for instance, that Larrabee contains many small and simple in-order processor cores rather than a more limited number of large, complex out-of-order cores like those of the Core 2 family of CPUs.

These cores are x86-compatible and support the same instruction set as Core 2. They're inspired by the original MMX-enabled Pentium,



Larrabee's multi-core architecture will remove virtually every serial process, so complex frame-by-frame rendering can be performed without causing bottlenecks.



WHAT EXACTLY IS VISUAL COMPUTING?

If you keep your expectations modest, there's some substance to the concept of visual computing. It refers to a continued progression in graphics rendering fidelity, in part thanks to the wider adoption of techniques like ray tracing.

Visual computing will impact a broad range of multimedia applications. And if Nvidia is to be believed, it will be here sooner than you think. GPU-accelerated video encoders, plug-ins for popular image- and video-editing applications and more are expected in coming months. Further out, the possibilities become rather more exotic. Real time analysis of video or even Hollywood-esque interfaces that use sophisticated gesture and speech recognition with added lip-reading capabilities could be on the cards.

Or should that be cars? Intel recently demonstrated a possible automotive application that would harness the power of a multiple-core processor. The gist of the technology involves semi-autonomous vehicles able to identify other vehicles and pedestrians and take evasive action to avoid accidents. A sort of simpler, consumer-level version of the machines that take part in the DARPA Grand Challenge competition for driverless cars. Without doubt, it's this kind of real-time data analysis that will benefit from massive parallel computing power.

TERASCALE COMPUTING

Related to Intel's visual computing strategy, terascale refers to a broad effort to develop massively multi-core processor architectures. 'Tera' means trillions and indicates how many operations per second these new chips will be capable of.

INSTRUCTION-LEVEL PARALLELISM

This is a measure of how many operations a computer chip can perform simultaneously. Previously, PC processors were optimised to run a single 'thread' of sequential operations. More recently, the importance of applications based on highly parallel data such as graphics is encouraging the development of multi-threaded architectures.

FLOATING-POINT OPERATION

This term refers to the movement of the decimal point in a string of numbers. The key advantage is the ability to express a wider range of numbers for a given bit width. The downside is reduced precision.

with an added super-wide vector unit capable of 16 32-bit floating-point operations per clock. The enhanced SSE units in Intel's Core 2 processor are only capable of four instructions per clock.

In more philosophical terms, Carmean says, the key concept is that it represents a shift from the conventional sequential processing of old-school CPUs. "Larrabee is a highly parallel architecture that we characterise as a throughput processor."

The basic idea is to create a chip that acts on many more threads in parallel at the cost of individual per-thread performance. It's possible to cram 10 in-order Larrabee cores in the same space as one Core 2 Duo, each core capable of four-way multi-threading. Courtesy of some simple maths involving the number of instructions handled by each core every clock cycle, the result is obvious; there's a massive advantage in throughput.

Intel refuses to be drawn on the question of exactly how many cores Larrabee will eventually contain. For starters, the architecture will spawn a wide range of chips sporting variable numbers of cores. However, Intel has confirmed that Larrabee will definitely be based on the 45nm production process.

Our guess for the question of Larrabee's final core count? Given that Intel made quad-core CPUs based on the 65nm node, that immediately lifts the possible Larrabee core count to 20. Then factor in the superior transistor density of the 45nm process, and 32 cores becomes the probable minimum for the chipset.

TOUGH COMPETITION

Even the latest DirectX 10 GPUs have separate units for shading, primitive set up, rasterisation and more, but Larrabee will do the lot in software. That means it will be capable of much more finely tuned load balancing than any GPU before it, and also means that only a software update will be required to allow Larrabee to support future graphics APIs.

Offsetting that advantage are a number of factors. Firstly, fixed function units are typically faster for any individual task. It remains to be seen if Larrabee's software rasteriser can truly compete with the fixed function units that AMD and Nvidia have painstakingly polished and refined over the past decade, for instance.

The same philosophy applies to the general issue of creating specialised graphics hardware. You only have to observe the beating either AMD or Nvidia suffers when one or the other launches a slightly substandard product to realise the fierceness of the competition. If Intel manages to launch Larrabee anywhere near the top of the pile, it will be a massive achievement.

However, it won't just be interesting to see whether or not Larrabee can compete with the big boys in the graphics market. It will also be absolutely fascinating to see whether it has an influence in the long term. Perhaps this is the shape of CPUs of the future. ETLB



The ultra-complex machines that take part in the DARPA Grand Challenge could soon be boiled down to kit that will run on a consumer-level processor.



Ubuntu's default accelerated effects are simple and effective.

The rotatable cube: one of many impressive visual effects.

The Compiz Configuration Settings Manager.

The accelerated desktop

If you want Ubuntu to look its best, all you need to do is dress it up a little. *Ashton Mills* shows you how.

One of the touted features of Vista was its slick GPU-accelerated interface providing effects like fading, transparency, and the Flip 3D doowacky. All these effects, and many more besides, actually found their way to the Linux desktop first before Vista, but it's only in recent versions of Ubuntu that they became installed and enabled by default.

Given Ubuntu's aim to be the easiest-to-use Linux distribution and thus in turn reach a wide audience using a huge range of hardware, the effects in Ubuntu are quite simple and err on the side of tasteful rather than snazziness.

But if you want snazziness, it's right there under the hood waiting to be played with.

COMPIZ FUSION

In Linux, accelerated 3D desktop effects are provided by Compiz Fusion, a specially designed compositing window manager. We've covered window managers briefly in the past but, in short, a window manager is a layer of the desktop subsystem dedicated to the rendering and operation of window elements (such as borders, buttons and so on), as opposed to the contents of those windows (the applications themselves). A compositing window manager is one in which desktop elements are first piped to a buffer where they are then combined, or composited, and processed with effects before being displayed. Vista, too, has a compositing window manager — Desktop Window Manager (DWM) — designed specifically to provide its effects.

If you click System > Preferences > Appearance > Visual Effects you'll find three levels for Ubuntu: None, Normal, and Extra. None disables Compiz, while Normal and Extra add effects provided you have 3D drivers for your GPU (Nvidia or AMD) installed. We covered in the first part of this new series how to do this using EnvyNG, so if you haven't already install the accelerated drivers for your GPU now.

Generally any relatively modern machine should have no trouble running with the Extra setting, but Compiz Fusion is capable of much more — and to start exploring we simply install the Compiz Configuration Settings Manager.

ADVANCED DESKTOP EFFECTS

If you click Applications > Add/Remove, select 'All available applications' for Show, and then type in 'Compiz' to the search field you should get a short list of applications. The first of these will be the Advanced Desktop Effects Settings, also known as CCSM (Compiz Configuration Settings Manager). Click to select it, and then hit Apply changes to install it.

Once installed first ensure Ubuntu has switched to use Compiz by clicking System > Preferences > Appearance > Visual Effects and ensuring Normal or Extra are selected. Then, launch CCSM by clicking System > Preferences > Advanced Desktop Effects Settings.

First, there are a *lot* of options to play with here. Aside from the various modules you can enable by ticking the box next to them, each can also be configured further buy clicking on the module name. Many have a wealth of options, but for the most part the defaults are fine.

If you've seen images of Compiz on the net you've likely seen effects like the desktop cube, Vista-like Flip 3D, Mac-like Expo, window previews and more. Here's how to enable all of these:

Desktop Cube

Under the Desktop heading enable 'Desktop Cube' and then 'Rotate Cube'. The former will prompt if you want to disable Desktop Wall as a result — select to do so.

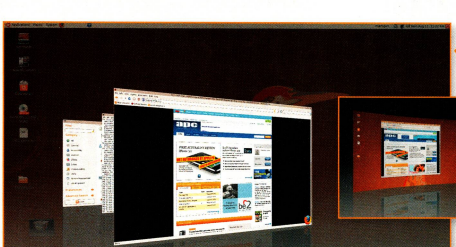
Further down, under the Effects section, enable '3D Windows' and 'Cube Reflection'. Then scroll down to Utility and enable 'Cube Caps' (these will default to Compiz backgrounds, but you can specify your own).

The snazzy desktop cube is now enabled, but by default Ubuntu only creates two desktop workspaces. To add two more, and thus give four for a cube, right-click on your workspaces in the taskbar and set columns or number of workspaces to four.

To rotate your desktop cube, hold down the middle mouse button on a clear area of the desktop and drag! You can also scroll the mouse wheel to spin the cube between desktops.

Window previews

To enable a real-time compact view of running applications from the taskbar, scroll to the Extras section and tick 'Window Previews'. Now when you hover the mouse over the name of a program on your taskbar, with the exception of some applications, you'll see a preview of the application. For a smoother effect, back in the CCSM click on the 'Window Previews' title and enable Generate Mipmaps.



One of many methods to switch between programs with Compiz.



Expo allows you to view all your desktops at once and drag programs between them.

> IF YOU WANT SNAZZINESS, IT'S RIGHT THERE UNDER THE HOOD WAITING TO BE PLAYED WITH

Switchers
Switching between applications is easy with Alt-Tab, but this can be presented in different ways. Under Window Management you'll see options for 'Ring Switcher' and 'Shift Switcher'. You can enable both if you like, and switch between applications using Alt-Tab, Super-Tab, or Super-Shift-S respectively. Note the 'Super' key is the Windows key on most keyboards.

The Ring Switcher is self explanatory. For the Shift Switcher, once you've pressed Shift-Super-S, use the mousewheel to scroll between programs. For a Vista Flip 3D-like effect, click on the Shift Switcher title and then under Switcher mode select 'Flip'.

Expo
Expo is another method to change desktops by presenting you with a view of all of them at once. Under Desktop enable 'Expo' and then, to activate it, hold Super-E. As with Window Previews, if you prefer a smoother look to the zoomed desktops, click the Expo title and enable Mipmaps. For extra show off ability, set 'Deformation' to Curve.

Zoom
Under Accessibility, make sure 'Advanced Desktop Zoom' is enabled if not already. Click the title and ensure 'Filter linear' is selected. To zoom up to any area of your desktop, hold down the Super key and scroll your mousewheel.

Finally, most of these effects make use of the texture-rendering abilities of your graphics card, and depending on the power of your card you can increase the level of texture filtering for better quality without impacting framerates. To do this click on 'General Options' under the General tab, and then click the 'Display Settings' tab. Here, set Texture Filter to 'Best'.

There are plenty of other options to play with such as the Water Effect, Paint Fire, Motion Blur, Blur Windows and Shelf. Explore the options and, if you run into trouble, use Ubuntu's default selections of 'Normal' or 'Extra' under the Visual Effects tab in the Appearance dialog to restore default settings.

DVD, FLASH, JAVA AND MORE

By now we've almost finished touring the look, feel, and interface of Ubuntu that we've covered in the last few instalments, but before we continue there's one last task we need to do: add some essential missing features such as DVD playback, Flash and Java support, and media codecs.

In the original Open Source Challenge, this was one of our major bugbears of Ubuntu, but not through any fault of ability: Linux has superb media capabilities (it's used professionally in this regard), but as media naturally encompasses content and codecs, licences and other limitations come into play. In the case of DVD playback, the code to decrypt DVDs can't be freely distributed with Ubuntu — but it can be freely downloaded.

Adding this support is quite simple. First, we need to add the Medibuntu software repository, as this contains the packages we need. Click System > Administration > Software Sources > Third-Party Software tab. Click Add, and type in the following:

```
deb http://packages.medibuntu.org/ hardy free non-free
```

And then click Add Source. Now click Close and, when prompted to reload the sources, select yes.

Now, in an example of where a command line can be quicker than a GUI, we'll use it here to install the necessary packages in one go instead of searching and installing them individually through Synaptic.

Click Applications > Accessories > Terminal. First we'll add the Medibuntu keyring, so Ubuntu recognises it as a trusted source:

```
sudo apt-get install medibuntu-keyring
```

Then, enter the following:

```
sudo apt-get install libdvdcss2 libdvdread3 libdvdnav4 w32codecs ubuntu-restricted-extras
```

If you use a 64-bit version of Ubuntu, replace 'w32codecs' with 'w64codecs'.

And you're done! Firefox should now work fine with sites using Flash and Java, and you'll have full media support in Ubuntu's default media player Totem. On that note, while DVDs and other media will play fine in Totem, it's not the best player out there for Linux.

If you click Applications > Add/Remove you can search for VLC (the same cross-platform player you can get under Windows), Mplayer and Xine, all of which will provide greater functionality than Totem. **EOTUS**

EXPERTS SOLVE YOUR COMPUTING PROBLEMS

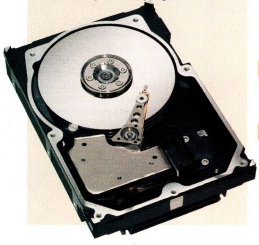
The combined staff and readership of *APC* Magazine, apcmag.com, and *APC* partner publications is like one giant helpdesk! If you have a technical problem, chances are one of us knows how to fix it.

WINDOWS

TIP!

HOW MUCH HARD DISK SPACE DOES VISTA NEED?

When preparing for an enterprise-wide Vista roll out, it's important that the target PCs have enough free disk space for the new operating system. The amount of free disk space can be found in many ways, from an SMS (System Management Server) report, through specialist network management software, or even from a simple batch file containing a couple of key commands. By default, the root of each logical drive is shared with a hidden share name such as '\\ mypc\c$'. The dollar sign at the end of the share prevents the share from appearing in a browse list but can be mapped explicitly. With this knowledge it's simple to map a network drive to the root of the target PC and use 'dir' to reveal the amount of existing hard disk space. Use the net command as follows: 'net use g: \\ mypc\c$'. Alternatively, use the MMC and connect to the remote disk management service. An upgrade installation requires 1,170MB, a standalone installation requires 5,445MB and an integrated installation requires a whopping 15GB.



HARDWARE

WHY ARE DRIVES FORMATTED IN FAT32?

Q Why is it that when you buy a hard drive (particularly USB external hard drives) they are formatted as FAT32 and not NTFS? After all, by far the majority of computers run operating systems that support NTFS, so this means the drive has to be reformatted. No real problem, except that I recently bought a 500GB drive and it took a couple of hours to reformat the drive.

Ian A. White

A1 Compatibility is the main reason. FAT32 is well supported, it works under Windows, Mac, Linux and even on some PVRs that have external plugs for USB. It also works with OTG bridges and photoframes and even MP3-playing USB units! The problem is not so much why not NTFS, but what else is suitable? NTFS certainly isn't, since it's a Microsoft-based file system with specifications withheld. It needs Mac OS and Linux people to run either drivers made through reverse engineering (or by breaking the EULA and repackaging Microsoft's NTFS driver).

The best advice is to format for your needs. Use NTFS if you're limiting yourself to Windows only, FAT32 if you're using it on different systems, ext2/3 or others if you want to run on Linux.

Gough Lui (apcmag.com/forums)

A2 It's also due to people who yank drives out without using the 'Safe to Remove' function. FAT32 doesn't get as rattled as NTFS can.

Lost Benji (apcmag.com/forums)

A3 Mac OS X has supported read operations on NTFS file systems since 10.3. The same applies to many Linux distros. Write support can often be added by way of third-party add-ons or kernel patching, but these are things that many users don't want to do. However, they all support FAT32.

Jarrod Spiga (apcmag.com/forums).

HARDWARE

PC FORGETS THE TIME

Q My computer has recently begun losing its time and date settings. It's also started running very slowly. I'm wondering if I have a virus that may be taking up processor time and meddling with my system settings. What should I do?

Eric Hicks

A It sounds like your CMOS or BIOS battery is flat. The BIOS battery keeps the BIOS memory working when your PC is turned off. The BIOS stores a number of settings such as the time and date, which drive Windows boots from, what ports are enabled and also critical processor and RAM configurations. All motherboards come with a BIOS battery installed, but this does, of course, run down over time. If you find that your time and date settings are not saved, then this is a good indication that the battery needs replacing. It's usually a CR2032 type.

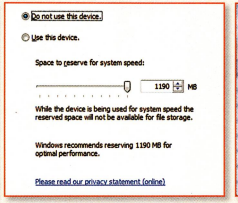


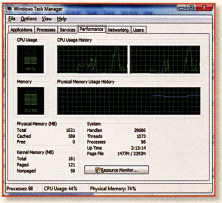
The BIOS battery ensures that all your BIOS settings are retained.

TIP... **SPEED UP VISTA**

YOU CAN INCREASE VISTA'S RAM WITHOUT BREAKING THE BANK







1 CONNECT YOUR USB STICK

Any memory stick over 1GB can be used to supplement the physical RAM inside your laptop. The stick can be used for other files at the same time and no data is lost when the stick is removed. Simply connect the USB flash memory to a free USB slot and wait for the USB prompt to appear. Choose the Readyboost option.

2 ALLOCATE MEMORY SPACE

The amount of space to allocate for system memory on the device can be adjusted if your memory stick is full. Vista will calculate the amount of required memory depending on the capabilities of the memory device and the amount of free space. Vista will recognise Readyboost-enabled devices each time they're connected and won't prompt again.

3 MONITOR THE RESULT

The Performance Monitor graph shows the effect of removing and re-installing the memory stick. The dip in the blue line indicates the reduction in available memory when the stick was removed. The amount of free memory available will change depending on the resources available from the memory device.

HARDWARE

INSTALLING XP ON A NETBOOK

Q I am trying to install Windows XP (with my original XP CD) onto my Acer Aspire One 150 netbook and I keep getting the blue screen of death. I boot the machine up from the XP CD in a USB DVD drive. It installs the driver and files until it comes to 'Starting Windows'. The RAM is a Kingston DDR2 200 Pin SO-DIMM compatible with PC5400 and PC4300 memory. Any idea as to what is wrong with it?

Kev

A Take the Kingston out and leave only the factory RAM. Now try and boot. If it's still BSODing, then run memtest and test the RAM. It's funny how people love buying Kingston memory for laptops when so many vendors publicly state they do not support Kingston. That's not to say yours isn't supported, but I see a lot of Acers and HPs coming in with the same issue. They all come good when the Kingston is taken out, however. Just because it's detected doesn't mean it's OK and going to play nice.

LostBenjii (apcmag.com/forums)

WINDOWS

UNLOCK THE TASKBAR

Q Under the Taskbar and Start Menu properties menu on my PC, the 'Lock the taskbar' option is greyed out, which means I can't make any changes to my taskbar. How can I reset this so I can make some changes?

Valerie McCormack

A This feature is sometimes disabled by technical support staff, but you can change it back to normal with a simple Registry tweak. Select 'Start > Run', type in 'regedit' and press Enter. Now drill down through the following sections:

'HKEY_CURRENT_USER > Software > Microsoft > Windows > CurrentVersion > Policies and Explorer'.

Now look for an entry on the right called 'LockTaskBar'. When you find it, right-click and delete it, then close the regedit program. You will now be able to change the status of your taskbar.

Inversely, creating a DWORD of that name with a value of 1 will grey the option out again.

WINDOWS

TIP!

AUTOMATIC DEFRAG IN WINDOWS XP

Regular disk defragmentation is necessary in order to keep your hard disk fast and efficient. The best time to defrag is just after you've started your system, as defragmentation is quicker when the Defragmentation tool doesn't have a large page.

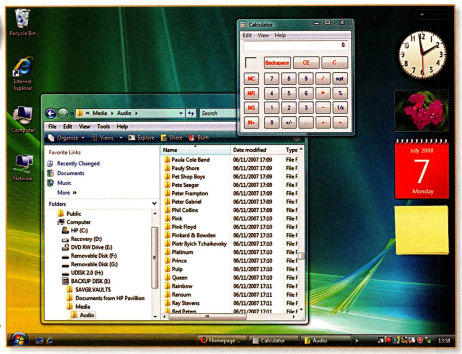
However, starting defragmentation from 'My Computer > Properties > Tools' can be awkward if you are in a hurry. A much easier solution is to set the defrag process to run automatically, either by adding a scheduled task or even by creating a new Registry entry. To do this, start 'regedit.exe'. Find 'HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunOnce' and add a new string value: 'AutoDeFrag'. Add the following data: 'Defrag.exe c: /f'. Defrag will now run automatically at the next restart.

WINDOWS

TIP!

MOVE PROGRAMS WHEN YOU MIGRATE YOUR PC

The USMT (User State Migration Tool) has been around for a while but has only ever been able to move personal data. Microsoft realised that many users see the requirement to reinstall programs and associated data as a significant obstacle in the way of migrating from Windows XP to Windows Vista. So to make this job a little easier, Microsoft has produced the WETC (Windows Easy Transfer Companion) as an addition to the WET files-only utility shipped with Vista. The source PC must be an x86 PC running Microsoft XP SP2, and the target PC must be an x86 PC running Windows Vista. Transfer is from PC to PC, not to any storage device, and the WETC can't use a USB connection, only a network cable or a 'WETC easy connection cable' (essentially a null modem serial connection).



No, this isn't Windows Vista — it's actually a screen grab of Windows XP running the Vistamizer emulation software.

WINDOWS

EMULATING VISTA ON XP

Q I quite like the look of Vista, but I know my PC isn't powerful enough to run it at its best — and I'm not ready to upgrade my PC yet. I have seen themes available to make XP look like Vista, but is there any way I can get it to actually feel like Vista too, including the new startup and shutdown screens, the sidebar and so on? In particular, can this be done by someone completely non-technical like me, without having to patch XP to allow non-Microsoft themes to be installed?

Richard Talbot

A As you say, there are many ways you can emulate Vista, including the use of programs such as WindowBlinds to allow non-Microsoft theme files to be installed. You're correct in that they are usually multi-part processes.

The best solution for you would probably be the Vistamizer program, available from **http://vistamizer.uptodown.com**. It transforms a Windows XP installation into a very acceptable clone of Vista, using a single installation program with easy-to-follow prompts.

To do this, Vistamizer alters a number of system files, but it does create a system restore point first so that you can get your PC back to exactly how it was before if you need to.

WINDOWS

RESIZE VISTA'S BORDERS

Q I use a 1,024 by 768 pixel monitor and have found Vista's borders to be too intrusive, taking up valuable desktop space. I have searched everywhere for an option to change their size but cannot find one. Is there a Registry hack I can use?

Kevin Martindale

A You won't need a Registry hack to resize Vista's borders, but the method you need to use is certainly counter-intuitive, which explains why you couldn't find out how to do it by clicking around on your computer.

WINDOWS

TIP!

VISTA FILE PERMISSIONS

Install programs as a restricted user

Vista's parental controls are a core feature that improve greatly on the complex permission-based system used in Windows XP. One feature is that users outside of the Admin group are denied the ability to install applications. Typically, family PCs are shared by both adults and children, with the ability to make system changes restricted to the administrator, usually with one or both parents sharing the root account.

Of course, this situation can lead to additional demands on parents who may not appreciate having to spend time responding to requests to install games and minor pieces of software on demand. However, the time required to install applications is reduced when the 'install as' feature is used. This means that it's not necessary to log on and log on again as a different user when installing the software.

1. Log on as the ordinary user.

2. Insert the program CD or other media, or find the setup file in Windows Explorer. If the program is on a CD and you have stopped the installation, you can restart it without reinserting the disk. In Explorer, right-click over the CD-ROM drive and choose 'Autoplay' from the menu.

3. Wait for Vista to challenge for permission. Enter the administrator password.

4. Choose the option to install for this user only.

Remove annoying file ownership problems

Vista is Microsoft's most secure desktop operating system. Part of this enhanced security is restricted file access. This prevents casual browsing by members of the admin group, which is annoying when you need to change a file belonging to another user. Getting around this restriction involves changing file permissions. Log on to the computer using an account that is a member of the administrators group.

Attempting to open a folder belonging to another user produces a challenge. Respond to the UAC prompt and you will find that you can read but not save changes to documents. Right-click over the file, choose Properties. Within Properties choose 'Security'. By default your permissions are Read Only. Choose 'Edit' and grant yourself modify permissions to the file.

LINUX

TIP!

REMOVE OLD PACKAGES TO SAVE SPACE

In Ubuntu and other Debian-based distros, whenever you download an application using 'apt-get install program', the OS will retain the retrieved '.deb' files for later use. However, if you've downloaded a large program which has many dependencies, you'll want to salvage some drive space. You can do this with the command:

```
sudo apt-get clean
```

This will remove any old packages from the /var/cache/apt/archives directory. Of course, if you uninstall a program and later want to reinstall it after doing this, your distro will need to download the packages again.

```
21:44:09 (677.50 KB/s) - `bash_3.1dfsg-8_i386.deb' saved [872884/872884]

mike@mike-laptop:~/temp$ ar x bash_3.1dfsg-8_i386.deb
mike@mike-laptop:~/temp$ tar xfz data.tar.gz
mike@mike-laptop:~/temp$ ls
bash_3.1dfsg-8_i386.deb  control.tar.gz  debian-binary  usr
bin                      data.tar.gz     etc
mike@mike-laptop:~/temp$
```

Purging package downloads: here we've installed Hardinfo, but we see that the downloaded package remains. One command later and it's gone.

You need to right-click on the desktop and select 'Personalise'. Next, click on 'Windows Colour and Appearance' and find the link that says 'Open Classic Appearance Properties for more colour options', then click on it.

Ensure that the scheme you have selected is Windows Aero then click on the 'Advanced' button. You can now type a new size for the border, which can even be set to 0. When you are done, click on 'OK' twice to save the changes and exit, and the new border size will be immediately implemented.

Incidentally, you can use this technique to change other aspects of Vista's display that you cannot find options for in the non-classic menus.

WINDOWS

VISTA WON'T SHUT DOWN

Q I have a home-built computer recently upgraded to Windows Vista Ultimate, and it won't shut down, restart or hibernate properly. When I carry out one of these three actions, after the 'Shutting Down' message with the rotating circle, the screen turns off but the computer stays running in the background.

After about five minutes, the monitor turns back on to show a BSoD error with the message 'BUGCODE_USB_DRIVER'. I have updated all of my drivers and also use SP1. The boxes of all my hardware say 'Certified for Windows Vista' or 'Windows Vista Compatible'. Any ideas?

Sp33d d3mon

A There are three areas to check besides the obvious USB issue. The first is go into the BIOS and check the 'S State' setting and set it to S3 or auto. Some boards have S1 + S3 combined and this is also fine. Next is to go into the advanced power options (Control Panel or under screensaver settings) and look at the USB sleep settings. If these are played with then the system can hang and devices won't resume properly. Set the settings so the USB remains active.

Final shot is to have all USB devices unplugged and try a shut-down. Usual culprits are USB HDDs, overrated USB keyboards like the G15, webcams and USB TV Tuner cards. If the system shuts down without hassle then one by one add a device and try again until the offender is found. Also, when in the BIOS, make sure the USB is not set to old version 1.0.

LostBenjli (apcmag.com/forums)

OFFICE

ADOBE'S INFURIATING UPDATES

Q In the Ask *APC* column of your January edition, you referred to a way to stop Adobe Acrobat from needlessly trying to update. The constant updating is driving me nuts. On my computer I have Adobe Updater Certificate, Adobe Updater and Adobe Updater Manager. Which one am I supposed to delete?

Stephen Hunter

A[1] To be rid of Acrobat's annoying updater, you need to make sure that you can view Hidden Folders, then navigate to: C:\Program Files\Common Files\Adobe\Updater5 then delete the file adobeupdater.exe. Deleting this file will prevent Acrobat from launching it to pester you to upgrade. To some users, a better

LINUX

TIP!

RUN LINUX IN WINDOWS

I was surfing the web looking for ways of running Linux inside Windows and running both without rebooting. After about half an hour I stumbled on this gem: andLinux. It's a Linux kernel that has been ported to Windows. By using either a XFCE Panel or A tray icon you can install Linux packages and run them straight from Windows. The project is in Beta at the moment. I have installed it and ran it with no issues, I suggest it is worth looking at. Find it at *http://www.andlinux.org*.

Sam Fredericks
Tauranga, New Zealand

LINUX

TIP!

NEED TO GET A SPECIFIC FILE FROM A '.DEB' OR RPM PACKAGE? HERE'S THE SOLUTION

Sometimes you may need to grab a single file from a Linux package without installing the whole program. For instance, you may just need an image or help file in a package, and don't want to do a full installation. If you're using a '.deb' package-based distro such as Ubuntu or Debian, copy the '.deb' file you need to a new folder in your home directory. Then open up a command line, switch to the directory, and enter:

```
ar x filename.deb
```

This command extracts the .deb fi le using the 'ar' archiving utility, generating three new files. The one we're interested in is 'data.tar.gz' – the binaries and associated files for the package. Enter:

```
tar xfvz data.tar.gz
```

You'll see a new tree of directories created, mirroring those in your root (/) file system. You can then locate the file you want: for instance, if you need an executable binary from the package, you can look in the new 'bin/' or 'usr/bin/' directory, depending on what was created by the last command.

For RPM packages, use these commands:

```
rpm2cpio package.rpm > output.
cpio
cpio -id < output.cpio
```

This converts the RPM to a CPIO file (a relatively obscure but useful archive format) and then extracts the CPIO archive. You'll have a new set of directories such as 'etc/' and 'usr/' containing the package's files, so explore to find what you need.

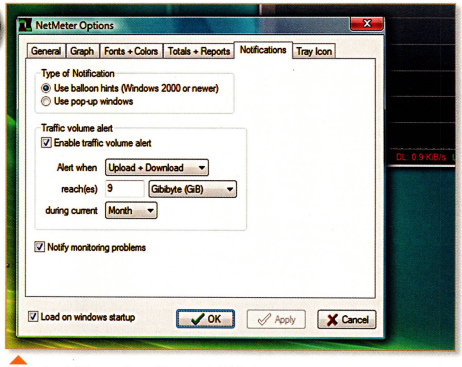
NETWORKING

TIP!

RESTRICT YOUR WI-FI TO NAMED PCS ONLY

In the good old days, securing your Wi-Fi was as simple as choosing a strong password. However, WEP can be cracked in a few seconds and WPA-2 is becoming easier to crack by the day. An additional layer of security can easily be installed if the router is told only to accept connections from known devices.

Use the router management software to add the MAC (Media Access Control) address of each network card that's used to connect to the router. The router will then refuse to connect to any device not already known to it. Finding MAC addresses is very simple. Drop down to a command prompt and enter the command 'arp –a' to produce a list of IP addresses and their associated MAC addresses. These are stored in the ARP cache; a dynamic list of the IP addresses and associated Ethernet MAC addresses that the host PC has communicated with. MAC addresses can certainly be spoofed, but the hacker would need to know the MAC address of a device on your network to do this.



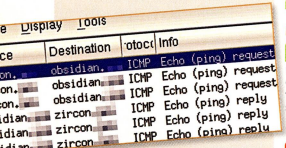
Monitor bandwidth usage: if your ISP sets bandwidth limits on your usage, ensure that you stick within them using the free NetMeter utility.

NETWORKING

TIP!

PRELOADING PINGS FOR QUICKER RESULTS

Simple though it appears on the surface, ping is quite a powerful tool. Packets are sent out and returned, and the round trip time is measured in microseconds. By monitoring pings carefully, you can tell when things have changed on a network – for example if it's someone changing a patch cord. Pinging at one ping per second does take time, but there are ways of speeding things up. If you use the '-l' switch, you can preload up to three packets, releasing them as fast as they will go. If you're sending out three packets to see if a machine is up, you can get a result in less than a second.



Preloading pings for quicker results: this makes sense if you want a program to run smoothly.

option would be to downgrade to Adobe Reader 7 or use Foxit Reader instead, but this solution definitely fixes the problem for good.

Tommy Sailing (apcmag.com/forums)

A² Not a bad solution, but I rather you rename the exe file instead of deleting it, in the rare case you might need it again. My solution was based on the fact I had a firewall that detected the outbound connection, and I just selected to block the connections permanently. This also prevents updating but is a less elegant solution as the updater sits in the background attempting to update ad infinitum whenever an Adobe package is open.

GoughLui (apcmag.com/forums)

INTERNET

MONITOR YOUR BANDWIDTH USAGE

Q Although my broadband plan gives me an allowance of 10GB each month, that isn't really enough and I keep getting billed for going over. Rather than upgrade to the next option, is there any way I can track my usage to help me stay under the 10GB limit?

Barry Caufield

A There's a very handy free utility called NetMeter, which you can get from **http://www.metal-machine.de/readerror/**. It comes with many useful options including exactly the one you need — bandwidth alerts.

These can be set to warn you if you go over a preset limit. By default, it installs to load at Windows startup — and you need to keep that checkbox ticked so that all of your computer's usage is monitored. A word of warning, though: if you have more than one PC connected to your broadband, you should install NetMeter on each of them and set the alerts according to how much of your bandwidth you wish to allocate to each computer.

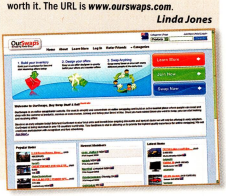
INTERNET

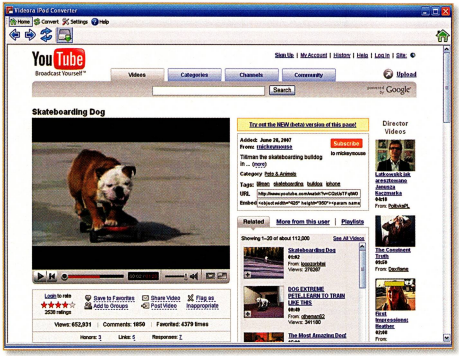
TIP!

SWAPPING SITE

This week I came across this really nice platform online which allows you to swap your stuff for cash or for other products and even services, I thought it was cool so I would love for you to guys to review it properly and tell me if it's worth it. The URL is ***www.ourswaps.com***.

Linda Jones





From DVD to an iPod: the Videora iPod converter can transfer videos from DVDs, YouTube and other sources to any video iPod.

MULTIMEDIA

FROM DVD TO AN IPOD

Q I have several home movie DVDs that I've recorded using my DVD camcorder. How do I convert them to play on my iPod?

Nathan Witt

A We're glad you asked about copying your own video, because ripping commercial DVDs (even ones you bought) is considered illegal by nearly all the big copyright holders. Anyway, you're going to need third-party software to do this, as Windows doesn't come with the necessary programs. We recommend the Videora iPod converter — you can download it at **www.videora.com**. There are various versions of the program and you need to select the right one for the type of iPod you own.

You should be able to convert most types of DVD, but you'll also need to download the DVD Decrypter program linked to from their site to pull the video off the disc in the first place. There's a comprehensive seven-step guide on the Videora web site that takes you through the process.

Incidentally, once you have the movies on your hard drive (and before downsizing them to your iPod's screen), you may want to edit them using Microsoft's Free Windows Movie Maker, which runs on any Windows XP or Vista installation. For more details just type 'Windows movie maker' into the search box at **www.microsoft.com**.

OFFICE

TIP!

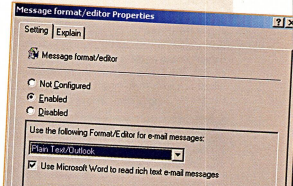
MANAGE OUTLOOK 2003 USING GROUP POLICIES

Email is now the standard for business-to-business communications, but it's also the favourite tool for spammers. As the spammers become more aggressive, so do the systems that are in place to defeat them, and this has an effect on our email use. For instance, emails sent in HTML format are more likely to become trapped in spam filters. So sending emails in plain text is good practice. Instructing your email users to do this is simple, but the default format for Outlook is HTML, and although this can be changed in preferences ('Tools > Options > Mail Format') the user can simply switch back again. To manage this, apply a group policy containing the Outlook administrative to your user group:

1. Download the Outlook 2003 Resource kit from *www.microsoft.com/office/orkarchive/2003ddl.htm*.

2. Use the Group Policy editor to create a new group policy called 'Outlook Plain Text' and apply it to the groups or OUs containing your Outlook users.

3. In User Configuration, expand templates. Right-click over administrative templates and add the new Outlook Template.



Manage Outlook 2003 using group policies: use group templates to make your business emails secure.



HARDWARE SUPER TIP

TIP!

HOW TO UPGRADE YOUR BIOS

THERE ARE A FEW PRECAUTIONS THAT YOU NEED TO TAKE BEFORE YOU UPGRADE YOUR BIOS

The BIOS (Basic Input/ Output System) is one of the oldest parts of the PC architecture, and it hasn't really changed much in the last 10 years or so. The purpose of the BIOS is to hold basic information on all your hardware settings and pass this onto the operating system. As such, this information is held on an EEPROM, which can be updated by writing new information to it. The BIOS is pretty much at the end of its life, and has already been replaced by Apple with the Extensible Firmware Interface (EFI), which contains its own boot manager (replacing the disk-based boot loader) and lets newer Apple Macs dual-boot both Windows and OS X. However, Microsoft decided not to include support for EFI in Vista, so we're likely to be stuck with the BIOS for some time yet.

INSIDE THE BIOS

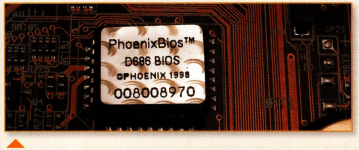
The BIOS consists of two parts: an area of volatile memory where you can enter settings and a non-volatile area that can be reprogrammed. The volatile area holds settings such as the date, time, what drives are attached, the boot order and so on. These are the settings that you can change. If you find that these settings are lost when you boot up, then the battery that powers the volatile memory has probably gone flat and needs replacing. The non-volatile part holds all the information that you can't change when entering setup, such as CPU microcode support, power-saving modes and so on. It also dictates what options are shown on the Setup screen. Each motherboard has a specific BIOS, although they will share many common features. Many motherboard manufacturers release BIOS updates that enable the motherboard to support new CPUs, fix bugs or add features.

REASONS TO UPGRADE

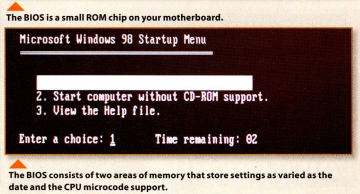
One of the most common reasons for wanting to update your BIOS is to add support for CPUs that have been released since your motherboard was manufactured. In this case, you'll need to download a new BIOS file from the motherboard manufacturer and reprogram — or 'flash' — the BIOS. The majority of BIOS-flashing programs require you to boot into DOS mode in order to reprogram the BIOS, although some companies, such as ASUS, supply Windows-based BIOS-flashing utilities. Windows-based utilities have become quite advanced and, depending on type, will show you detailed information about your current BIOS version, perform a CRC check on the new BIOS file to ensure that it's not corrupt and enable you to update the BIOS with new code. DOS-based flashing programs are more common however, and will require you to boot into DOS, then run the program from a command line. However, as Windows bypasses DOS and you can't access an NTFS partition from DOS, you will need to use a boot disc. In addition, as few PCs now have floppy drives, you'll probably need to make a boot CD. Some flashing programs come with the tools to make a boot CD, but most don't, so instead you'll need to download a boot image from somewhere like *www.allbootdisks.com/download/iso.html*. If you use NTFS, you'll also need to create a small FAT32 partition before placing the BIOS flashing tool and the new BIOS file on the partition. Or, if you can access memory sticks from DOS, place the files on a memory stick instead. Once you've booted from the CD, you'll need to navigate to the partition or memory stick where your BIOS flashing file is stored and run the program. Most new flashing programs will find the new BIOS file automatically and run it, sometimes saving your existing BIOS file. Others may need you to type in the name of the file you want to save, then the name of the file you want to load. Some also require you to type in the name of the flashing program, followed by the name of the new file, so make sure you've written it down! Should the flashing procedure fail and you end up with a corrupted BIOS, your motherboard manual may tell you how to revert to an older version, or at the very least how to boot up so you can run the flashing program again. If no such procedure is listed and it's not an absolute necessity to update the BIOS, it's probably best to leave the BIOS as it is.



Some manufacturers supply tools for updating your BIOS in Windows.



The BIOS is a small ROM chip on your motherboard.



The BIOS consists of two areas of memory that store settings as varied as the date and the CPU microcode support.



Ask the questions

Get quicker answers to your questions. Send them to http://apcmag.com/askapc for other expert readers to answer online. A selection will continue to be published in the magazine.

Q I would like to create a macro (if that's the correct term) for an Excel sheet where once you click on a field, like Name, Company or Phone number, a message box comes up asking relevant questions such as, "What is the Company's name?" After the user inputs a company name he or she will have to click on Next. Of course the next message box will appear for the next question and field to be filled out. Is this possible with Excel?

Kenneth Lau
http://tinyurl.com/excelforms

Q I'm running a Vista Media Centre with an P5E-V-HDMI motherboard, E8400 chip, Gainward 9600GSO graphics card and 4GB of RAM. Should I be running Vista 64-bit? Is there anything else I should add to my system to improve my experience?

James Shaw
http://tinyurl.com/enhancepc

Q Well, we've reached the 4GB upper limit for 32-bit CPUs. What happens if I want an 8GB system? Do I need an AMD 64-bit CPU with Vista 64-bit OS? Can you please recommend an 8GB beast, and where do we go from here?

Chris Lee
http://tinyurl.com/morethan4gb

Q After installing Spybot Search and Destroy on my neighbour's PC running Vista Home Basic, I clicked the Immunise button and got a prompt that I don't have sufficient privileges to perform this operation, and I need to do it from an elevated level (or something similar). How do I do this, as there is only one account on the computer (his). It is not possible to right-click and select 'Run as Administrator' or the like.

Bruce Pierson
http://tinyurl.com/spybotproblem

Q In your August mag you included the Panasonic TH-50PZ800A HDTV as the top choice for sports. The timing of this issue was perfect for me as I was just about to go out and buy the Pioneer (and not happy about the price) as I did not want to compromise on sporting programs. I had originally had the Pananonic at the top of my list — as the price has come down considerably — but on some forums some of the punters bagged the Panasonic, in particular referring to its rendering of small moving balls against crowds. Some indicate it's a problem with the upscaling from 576i sports and the rendering issue, but some say it's the TV itself. Has anyone noticed the problem and what's the possible cause?

Mick Lister
http://tinyurl.com/tvsport

Q I have recently had my IP address with BigPond changed by them from the default dynamic IP address to a Static IP address. In doing this is there any advantage to me and/or to BigPond?

Noel Andrews
http://tinyurl.com/ipquestion

Q I want to be able to access my paid-for cable internet service wirelessly up to 100km away from my home. Why should I have to sign up to a wireless broadband plan when I have cable? Why can't I buy a product that I can connect to my laptop to access my cable connections service back home for free. I understand about Wi-Fi hotspots, but there are very few where I need them.

Terry Humphries
http://tinyurl.com/cablequestion

Answer the questions

If you can answer one of the questions above, please go to the web address listed at the end of each question. Each month we publish the best of the questions and answers in the mag. You can still send your answers to us via email at http://apcmag.com/askapc, but we encourage you to post answers online so readers get quicker responses.

SEARCH ENGINE OPTIMISATION

Part 2 OF TWELVE

Understanding searchers and search engines

WHAT'S COVERED

Overview
In this new Masterclass series, Ash Nallawalla walks you through everything you need to know in order to make your web site optimised for search engines. By the end of the Masterclass, you'll have all the tools at your disposal to generate traffic and get hits on your site.

ABOUT YOUR TUTOR

Ash Nallawalla
Ash Nallawalla manages natural and paid search traffic for some of Australia's largest web sites. He is an internationally acknowledged expert in search marketing and he previously operated an SEO training business. Ash can be contacted at *seo@acpmagazines.net* and he blogs at ***www.netmagellan.com.***



Did you build a web site and nobody came? *Ash Nallawalla* explains why and how you can attract the right visitors. Last month we took a high-level view of the SEO landscape. This time we start with a user's search and understand how it is processed by a search engine.

Search engines have been with us for over 10 years and they keep improving, particularly Google. We can search not only for web pages, but also images, news, blogs, movie times, weather and a host of other specialised searches. This broader view of search behaviour is important for SEO.

How do novice computer users write a search term? Typically they are not sophisticated searches and it could take two or more attempts to improve the search result. For example, if a novice searcher was planning to find an Indian restaurant in Melbourne, they might try:

- Indian restaurant
- Indian restaurant in Melbourne (might include results for Melbourne, Florida)

Next, they might restrict the results to Pages from Australia and realise that Melbourne is a large city and they had better search a specific suburb or two. A novice searcher at this point might type in turn:

- Indian restaurant Malvern
- Indian restaurant Collingwood

An experienced searcher might try something like this for their first search, with quote marks:

- "Indian restaurant" Malvern OR Collingwood

You can see that searchers are unpredictable.

SEO customers sometimes assert unrealistic expectations, say, when they want to rank for a single word such as "camera". Such a term is unfocused because it could be a film camera or a digital camera. Does the customer want to sell cameras or buy cameras?

You, the SEO, have to help them to clearly define the purpose of the web site, say, "Kodak digital cameras for sale", so that you can check that the text contains related language.

HOW SEOS SEARCH

SEOs can use advanced operators to get useful information from Google. Details are at **http://tinyurl.com/4tcdg**. Here are some of them (please omit quote marks).

Allintitle: If you search for **allintitle: Chrysler cars**, Google will only show URLs that have both the words **Chrysler** and **cars** in the title of a page.

Intitle: If you search for **intitle:Chrysler cars**, Google will only show URLs that have the word **Chrysler** in the Title and **cars** in the body or title of the document.

Allinurl: If you search for **allinurl:Chrysler cars**, Google will only show URLs that have both the words **Chrysler** and **cars** in the URL.

Inurl: If you search for **inurl:Chrysler cars**, Google will only show URLs that have the word **Chrysler** in the URL and **cars** in the body or URL.

You will want to use such queries to understand why certain sites show up in the results and others do not. They are also handy for making searches.

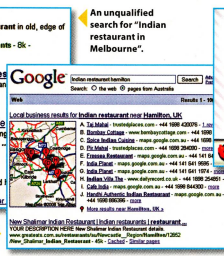
The **link:** operator gives a limited list of sites that link to you, including your own internal links. This prevents reverse engineering the Google algo and is best regarded as entertainment value.

Example: **link:www.ibm.com**

The **site:** operator lists the pages indexed in



An unqualified search for "Indian restaurant in Melbourne".



Sometimes even Google gets confused about some Australian place names.



apcmagpro.com's home page shows a PageRank of 4 out of 10.

the search engine. You only see the first thousand.

Example: **site:apcmag.com**

GUESSING THE ALGORITHMS

At online forums, SEOs love to guess various factors that make up the 'secret sauce', otherwise known as a search engine algorithm. Since Google is the predominant search engine, most of the focus has been on trying to understand its algorithm.

There isn't one algorithm — there are many that come into play depending on the type of search. There are search ranking algos, image ranking algos, blog ranking algos, and so on. There isn't much point in guessing, unless it is informed guesswork based on several observations. Another approach is to read its patent applications. See **http://snipurl.com/113z7**. Most patents are not easy to understand, so by reading other people's posts about them, you can try to guess what is in the Google algo. For example, the age of a domain name or the duration of its registration are believed to be ranking factors because they are in a patent.

SEARCH ENGINES

Understanding how a search engine works makes learning SEO easier. Google's official explanation is at **http://tinyurl.com/4nb45j** and at **http://tinyurl.com/6qarx**.

At the heart of their search engine software is PageRank, a numeric value between zero and ten derived from the number of links to a site and their quality. Here is Google's description:

"PageRank relies on the uniquely democratic nature of the web by using its vast link structure as an indicator of an individual page's value. In essence, Google interprets a link from page A to page B as a vote, by page A, for page B. But, Google looks at more than the sheer volume of votes, or links a page receives; it also analyzes the page that casts the vote. Votes cast by pages that are themselves 'important' weigh more heavily and help to make other pages 'important.'

"Important, high-quality sites receive a higher PageRank, which Google remembers each time it conducts a search. Of course, important pages mean nothing to you if they don't match your query. So, Google combines PageRank with sophisticated text-matching techniques to find pages that are both important and relevant to your search. Google goes far beyond the number of times a term appears on a page and examines all aspects of the page's content (and the content of the pages linking to it) to determine if it's a good match for your query."

In reality, it is a lot more complicated and most of it is a closely guarded secret. PageRank is a relatively small ranking factor these days.

CRAWLERS, ROBOTS, SPIDERS

Search engines use programs known as crawlers/spiders/robots that follow links on a web page and thus 'discover' other pages on a given web site and then on other web sites that are linked from this web site.

A robot isn't necessarily a search engine spider. It can be malicious code that mimics a search engine spider but which actually collects — for example — email addresses for spamming purposes.

SEARCH ENGINE INDEXING

Indexing is the proper classification and placement of web site content in the search engine databases. For the user, this means that a search should result in the most relevant pages being listed in the search results.

A definitive description of Google's indexing process comes from Google engineer Matt Cutts' blog: **http://tinyurl.com/paaz7**, which is a rather long article but should be read at an early point in your SEO studies.

RANKING

While indexing merely implies that a given web page is 'somewhere' inside the search engine document database, it does not mean that the page will appear for a particular search on the first page of results. Indexing is a precursor to ranking. Indexing begins with the search engine finding a page or through submission of the web site home page address, or submission of its sitemap.

So, what happens when a searcher submits a search term? The algo determines which indexed pages are most relevant to that search term, and this determines which URLs appear on the first page, second page and so on.

Today, search engine ranking algorithms pay particular attention to:

- The age of the domain name
- The 'authority' value of the web site
- The link anchor text
- Usage data
- The page content, including the presence of key phrases in the title, heading and body text.

PAGERANK

I am deliberately avoiding saying much about Google PageRank, a numeric value Google displays for a web page when you use the Google toolbar. It is a distraction for proper SEO when people worry about the numeric value, particularly when it goes down. I only get concerned when the green and white bar turns grey, that is, it is not even zero, and this might indicate a penalty. A brand-new site that is not known to Google also shows a grey bar. This numeric value has very little significance for a page to rank high for a particular search phrase.

TRUSTRANK

TrustRank is a link analysis technique that uses a set of seed pages that have been evaluated by a human expert and then looks for others that have the same characteristics. It is also described in a scholarly paper: **http://tinyurl.com/9w2pd**.

It is designed to show quality pages to a searcher while devaluing spammy pages. Google's algorithm is also believed to use a similar technique. This is why a link from the BBC to some site will have more value than one from someone's personal blog.

NEXT MONTH

- Writing for Humans and Search Engines





Part 1 OF FOUR

Your ticket to the virtual world

Server virtualisation is one of the most revolutionary IT developments in years, and everyone from large companies to small businesses are assessing its implications. In this four-part primer on virtualisation, *David Braue* explains the technology and what's behind it.

The IT industry is well known for its ability to hype up new technologies, often well beyond anything resembling realistic expectations. Yet server virtualisation continues to impress even the most jaded critics as it continues to build on its momentum as an agent for significant change within businesses and corporate data centres.

Donald DeFoe, applications manager with mining, chemicals, and consumer product giant Orica, was among the unconvinced when the company commissioned systems integrator Data#3 to audit its existing data centre. The results were a shock: "We were very surprised that the actual utilisation was very low," DeFoe explains. "We were basically hosting one application per server." This realisation led Orica to kick off a major project to embrace server virtualisation — a technology that enables the significant compression of the unused space in company data centres. By the time the project was through, Orica had used VMware Virtual Infrastructure 3 to reduce the space consumed by its servers from 15 data centre racks down to just two, halving the amount of power its site consumes and giving the company's IT staff far more flexibility in keeping their systems running.



VMware is the biggest player in virtualisation solutions but is being joined by others, particularly Microsoft, whose Hyper-V is a virtualisation platform that runs on top of Windows Server 2008. Intel and AMD have also gotten into the game, designing their server processors with a number of features that make virtualisation easier overall.

A VIRTUAL REVOLUTION

To understand how virtualisation works, take a step back and consider the humble credit card. A recent Datamonitor survey found that one-third of Australians have more than one credit card; if you're among them, you probably have several cards with balances sitting well below the credit limit. You may be keeping the extra credit available in case you ever decide to splurge on a spur-of-the-moment trip to Europe, to buy that dress you just *have* to have, or even just to cover those unexpected everyday expenses. However, keeping those credit cards active is costing you hundreds of dollars a year in unnecessary annual fees — as well as untold costs incurred by leaving balances on higher interest-rate cards.

Your average company treats servers the same way. While they might install one major application to run, say, their warehouses, they probably also have a load of other systems. Orica, for example, was running systems such as IBM Lotus Notes to provide email to its 15,000 employees; Oracle applications for its internal business administration; Oracle's Hyperion performance management to analyse its business performance; and Blackberry Enterprise Server to deliver email to its mobile employees. Each of these applications is usually configured on its own server, to ensure there are no conflicts with other systems and that they perform at their best. However, over time this strategy means most companies end up with a large number of servers, each doing very little. Many servers typically use just 10 to 15 per cent of their computing power at any given time — but each one chews up power and costs as much to keep running as a separate system.

Virtualisation technology allows companies to combine applications from many different servers onto a single system, making more



When 40 million customers show up at Dell.com,

who helps greet them at the door?



efficient use of available CPU power while eliminating the running costs of all those extra servers. It is, to use the credit card analogy, like doing a series of balance transfers to combine your outstanding balances into a single card with a larger balance.

STABLE TECHNOLOGY, EMERGING MARKET

Virtualisation isn't actually a new concept: IBM, Amdahl and Hitachi Data Systems pioneered the concept in the 1980s in their massive mainframe computers, which were packed to the brim with processors and disk space. Each application installed on the mainframe would be assigned its own LPAR (logical partition), and the mainframe operating system's job was basically to jump between the LPARs — like a waiter at a busy restaurant — making sure every app was running happily and efficiently.

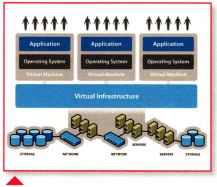
Modern virtualisation solutions apply the same concept to 'commodity' servers, those running x86-derived processors, typically from the likes of Intel and AMD. Years ago, these systems weren't designed to support more than one OS, but back in 1999 a startup called VMware stumbled onto a revolution when it discovered a way to get Windows applications running on Linux machines. Its method was to use special software that created a 'virtual machine' (VM) — a self-contained space that emulated a completely separate computer, tricking any software loaded into the VM into thinking it was running on its own system. This meant that, even though Windows and Linux are fundamentally incompatible, they could run simultaneously because they were both designed to run on the same underlying x86 processor. The VM was managed by a 'hypervisor', a piece of software that mediated between the VM and the operating system, managing access to the computer's resources to ensure they never conflicted. As hypervisor technology improved, it became clear that the same technique could be used to run multiple VMs at the same time on a single machine — and server virtualisation was born.

In the years since, VMware's flagship product — ESX Server — has become synonymous with server virtualisation. It quickly piqued the interest of IT managers within many companies who began testing its capabilities, impressed with the capabilities it offered. Those technologists suddenly found themselves with a compelling tool to deliver dead-easy business benefits, cut costs and make their own lives simpler in the process. As word spread, VMware ballooned into a global technology giant, being purchased by storage giant EMC in 2003 for US$625 million. In 2007, VMware conducted an IPO that catapulted it into the ranks of the world's 10 largest software vendors, at one point enjoying a market capitalisation of more than US$20 billion. Atypically for the IT market, VMware was almost left alone to build its fortunes. Microsoft, usually quick to jump onto new technology trends, shied away from embracing server virtualisation for a long time. This was because many companies were creating VMs based not on Windows but on the free and highly configurable Linux OS. This meant they didn't need to buy so many copies of Windows — especially for basic jobs such as running web servers and file servers. VMware's only real competition came from the open-source world, where a global team of enthusiasts came up with Xen, a free and open-source hypervisor that was developed extensively before being purchased by Citrix Systems last year. Citrix released an upgraded version of Xen, now called Citrix XenServer, in March this year — just months before Microsoft finally came to the game with Hyper-V. Meanwhile Intel and AMD's server processors are now being designed to support hypervisors.

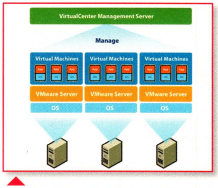
BUSINESS DRIVERS

With competition in the market now real, businesses are spoilt for choice when it comes to picking virtualisation solutions. VMware is still dominating the market, but Microsoft is pushing Hyper-V hard for its close integration with Windows Server 2008. Citrix, for its part, is promoting XenServer's credentials and its vision of thin-client computing, which is only a little removed from virtualisation.

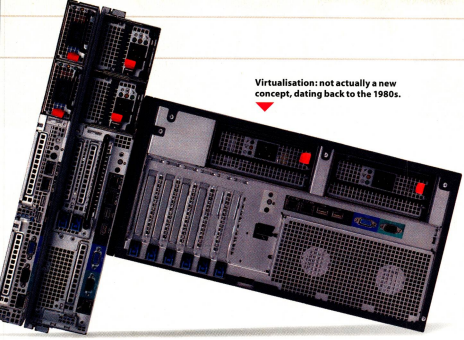
Whatever option they choose, businesses embracing virtualisation are doing so for



A virtual infrastructure, as opposed to a physical one, offers several tangible benefits.



Virtual machines are just that — virtual — meaning your setup is more power-efficient.



Virtualisation: not actually a new concept, dating back to the 1980s.

> THE THIRD REASON COMPANIES LOVE VIRTUALISATION IS IT ALLOWS THEM TO QUICKLY SCALE UP TO MEET DEMAND

several reasons. Firstly, and most financially beneficial, is the technology's ability to consolidate many servers onto one. Servers are expensive to operate, complicated to run properly, and consume large amounts of electricity and air conditioning in data centres that are becoming increasingly overloaded. By virtualising their servers, as Orica and others have found, it's possible to get the same overall performance with a fraction of the hardware.

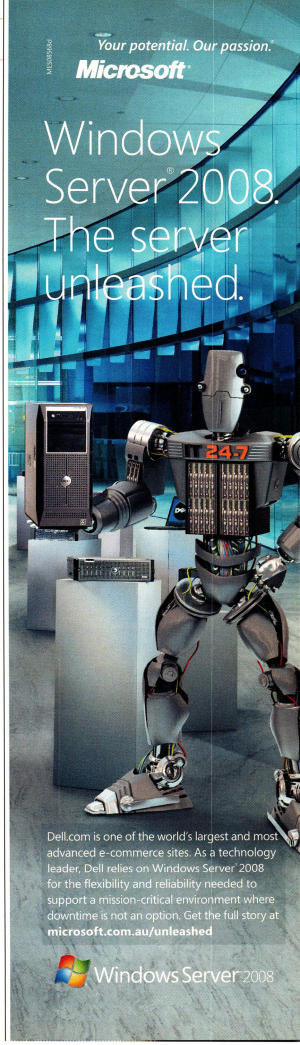
Secondly, virtualisation is fantastic for testing and development. Applications used to run companies are being upgraded and tweaked all the time, and it's horribly inefficient for software developers to have to keep a bank of servers running just to test their programs on. Using virtualisation, developers can create a new VM in just a few minutes, load their new program and see what happens.

Once the testing is complete, the VM can simply be deleted; a VM is, after all, nothing more than one very large file on disk. This means developers can build and test applications much faster, and more effectively, than ever. This flexibility is also invaluable for companies doing maintenance on a server: instead of bringing the whole server offline, it's easy to duplicate a VM, do the necessary upgrades on the backup VM, then switch them again once the new environment has been updated and tested. "This gives us flexibility in how we manage our environment," says Orica's DeFoe. "In the past, we had to negotiate outages with our end users and, being a global organisation, we had to consider time zones as well. This way, we can do our management during business hours and the users don't ever notice it."

The third reason that companies love virtualisation is that it allows them to very quickly scale up to meet surges in demand. In the past, a company with a hugely popular web site used to have to wait for weeks for new servers to be purchased, configured, delivered, tested and installed. Using virtualisation, they can keep an archive of preconfigured VMs — for example, a web server. If demand on the web site spikes, they can meet it by starting up several more VMs with a few clicks.

A fourth key benefit of virtualisation is disaster recovery. Since VMs are just files on disk, those files can be easily copied from the primary server to another system in another room or another building. By keeping the VMs in sync, a data centre disaster becomes little more than a headache, since the backup VMs can quickly take over processing.

The final key benefit of virtualisation lies with the environment. Whether driven by genuine altruism or corporate bandwagon-hopping, today's companies are greener than ever — and data centres, which are growing at a rapid pace and consuming an ever-larger proportion of the world's energy, are public enemy number one. Minimising the number of servers in use slashes power consumption by the servers as well as the air-conditioning systems needed to support them: Orica, for example, cut its data centre's power consumption in half and expects that its virtualisation solution will reduce its data centre's CO_2 emissions by one million tonnes over the next three years. "As an organisation, we are into things like sustainable energy," says DeFoe. "Virtualisation reinforced the principles of every part of the organisation. And, as IT professionals, we need to consider issues like this. The future is in our hands." ETTE



Reviving dead data

Crashes vary in severity, but they usually involve some data loss. *Joe Cassels* shows you how to undo the damage.

REQUIREMENTS

- **PKZIPFIX**
  This provides a fix for damaged zip files (**www.tinyurl.com/4lvcqe**).
- **NOTEPAD**
  Useful for examining the contents of damaged files.
- **CORRUPTION CORRECTOR**
  Given two or more different broken versions of the same file, this tool can resurrect the original (**http://ccorr.sourceforge.net**).
- **UNHIDER**
  Get back hidden windows containing unsaved data (**www.softdesigner.com/unhider/**).
- **PEBUILDER**
  Create a bootable recovery disc using Windows XP installation files (**www.tinyurl.com/qh5bl**).
- **PC INSPECTOR FILE RECOVERY AND SMART RECOVERY**
  Recover files from hard/flash drives (**www.pcinspector.de**).
- **SMART NTFS/FAT RECOVERY**
  This offers file system-specific scanning and recovery (**www.smartpctools.com**).

Sooner or later you'll lose data, even if you have the best back-up strategy in the world. Thankfully, all is rarely completely lost should your data get mangled. In most cases there are steps you can take to recover some, most or all of the missing bits and bytes.

Data loss falls into three broad categories: physical damage to media, accidental deletion or data corruption. An independent backup will normally negate all of these, as long as it hasn't befallen the same fate as the original. Curiously enough, it's often people who think that they have the most bulletproof back-up regimes who suffer most when data loss occurs. Complacency can creep in and wreak havoc. Be especially wary of solutions like RAID for a desktop. While certain variants can ensure your data will survive hard drive failure, the more common scenario of accidental deletion might not be covered.

Windows includes its own fail safe against accidental deletion in the Recycle Bin. The problem is that most users know that stuff in the bin has effectively just been put to one side, so they regularly empty it. However, what if it's just been emptied and then you remember a file that you really should have kept? In most cases an undelete utility is all you need to save your skin.

NOT-SO-PERMANENT DELETION

When you delete a file from your hard disk you may think that the file is physically deleted. This isn't actually the case. To speed up performance, Windows replaces the first few bytes of the file with a flag that tells it that the space currently occupied by the file is up for grabs. The file vanishes from Windows, but until that space is filled by another file, the original remains intact.

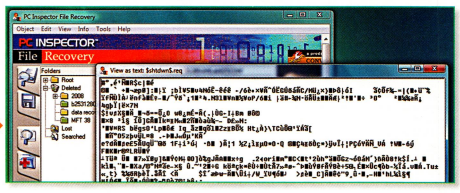
How long that file remains available for retrieval is an inexact science. Some can be recovered months or even years after they were originally deleted, while others might be overwritten in days or even hours. If the file is fragmented then you may find parts of it remain while others have been overwritten. Generally, the longer a file has been deleted for, the less likely it is to be recoverable in full. Other factors include the amount of free space and how busy the hard drive is.

Undelete programs can work in slightly different ways, so it's worth trying at least two different utilities to get the data back. This is important if you've managed to recover some, but not all, of the file. It's possible that a different algorithm might be able to restore more of the data or uncover different parts of the file.

Some people opt to use a data-shredding program like Eraser (**www.heidi.ie/node/6**) to securely delete sensitive files. This overwrites the data to prevent undelete utilities from recovering it. If the most secure settings are used to delete a file, you won't be able to get it back. Some professional services are able to reconstruct data after overwriting, but it's a time-consuming and costly process.

DATA CORRUPTION

Corrupt files can be devastating, depending on which ones they are. A damaged Master Boot Record can render a PC unbootable, but even a relatively benign scrambled Office file can be problematic if the contents are important and the corrupt version has written over the backup.



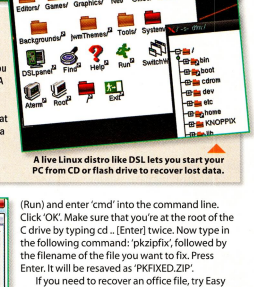
Different software can help in various situations. Even if all that remains is a partial file, you can get a text or hex dump of what's there.

SPOTLIGHT ON... BOOT DISCS

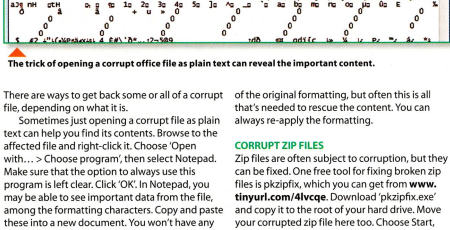
If you need to re-install Windows to get your PC up and running again, you could lose files that haven't been backed up. While it is possible to recover them using recovery software, the chances of doing so are greatly reduced.

Therefore, it's a good idea to find an alternative way to boot your computer without modifying the hard drive. We've discussed creating a boot disc using the pre-installation environment and your existing Windows files, but if you don't have these handy, you're better off downloading a ready-made Linux-based boot disc in ISO format. You can find a list of Live CDs at *www.frozentech.com/content/livecd.php*, including download links. Consider a small distro like Damn Small Linux, which is only 48MB in size and therefore not a huge download.

If you use a live CD, you need to boot from your CD drive. Most computers do this by default, but you may need to enter the BIOS to enable CD booting. A Linux CD will enable you to browse your hard drive, but if you don't have a second drive installed or access to a home network, you'll need to ensure that you can burn files to CD to actually get the data to a safe place. If you've got a CD/DVD rewriter, make sure that the distribution you choose includes software to support it.



A live Linux distro like DSL lets you start your PC from CD or flash drive to recover lost data.



The trick of opening a corrupt office file as plain text can reveal the important content.

There are ways to get back some or all of a corrupt file, depending on what it is.

Sometimes just opening a corrupt file as plain text can help you find its contents. Browse to the affected file and right-click it. Choose 'Open with... > Choose program', then select Notepad. Make sure that the option to always use this program is left clear. Click 'OK'. In Notepad, you may be able to see important data from the file, among the formatting characters. Copy and paste these into a new document. You won't have any of the original formatting, but often this is all that's needed to rescue the content. You can always re-apply the formatting.

CORRUPT ZIP FILES

Zip files are often subject to corruption, but they can be fixed. One free tool for fixing broken zip files is pkzipfix, which you can get from **www.tinyurl.com/4lvcqe**. Download 'pkzipfix.exe' and copy it to the root of your hard drive. Move your corrupted zip file here too. Choose Start, (Run) and enter 'cmd' into the command line. Click 'OK'. Make sure that you're at the root of the C drive by typing cd .. [Enter] twice. Now type in the following command: 'pkzipfix', followed by the filename of the file you want to fix. Press Enter. It will be resaved as 'PKFIXED.ZIP'.

If you need to recover an office file, try Easy Recovery File Repair from Kroll Ontrack. You can get a limited feature trial from **www.tinyurl.com/3bb2t2**. Select the type of file you want to recover and then browse to it. Click 'Next' and the software will attempt to recover the file. If you've downloaded a file that's turned out to be corrupt, try downloading it again under a different filename. If the new version is no better, use Corruption Corrector, which will try to recover a complete file from two or more corrupt versions. It's free from **http://ccorr.source forge.net**, but you'll need a Java Runtime Environment installed.

HIDDEN WINDOWS

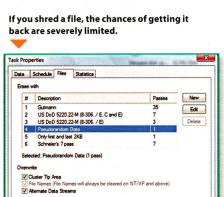
Sometimes a crashed process can lose you data. If Explorer.exe crashes while you have windows open that hold unsaved data, you may lose the contents of the windows and be forced to start over. However, a cunning little tool called Unhider could come to the rescue. You can get it from **www.softdesigner.com/unhider/** and it enables you to reopen hidden windows, giving

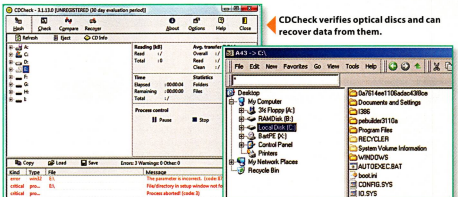
DO THIS... PC INSPECTOR FILE RECOVERY

PC Inspector File Recovery can scan your drives for lost data and restore full or partial files. You can get it from *www.tinyurl.com/374d8b*. Install and launch it, then choose the kind of data you're looking to retrieve by clicking one of the three buttons on the left. If you're after deleted data, click the top-left icon. You need to start by detecting the drives installed on your system and then selecting a logical drive to investigate. You're presented with a Windows Explorer-like directory tree, where the deleted files and folders appear in green.

To restore a file, select it and click the disk icon in the left-hand pane to save it to a different location. You're advised to select a completely different drive. If you're looking for a file that you know you deleted, take a look in the deleted folder. Sometimes lost data isn't helpfully organised into files and folders. If you were unable to find what you wanted using a file search, try selecting 'Tools > Find lost data'. This examines the drive on a cluster-by-cluster basis and returns any recognisable files from the raw data.

Lost data, caused by a quick format, system or program crash, is retrieved in a similar way to deleted files. If the drive is still active, select it from the Logical Drives list and when the Select Cluster Range dialog appears click the tick. Then sit back and wait – it could take some time. PC Inspector File Recovery will find lots of lost files, most of which will be fragments, so be prepared to spend some time going through them all. As before, select the file(s) identified, right-click and choose 'Save to. . .'.





you a chance to save your work before rebooting.

Severely corrupt data could mean that your PC won't boot and you'll need to re-install Windows before you can use it again. You may find yourself in a similar position if you have damaged sectors on your hard drive. If you can't get into Windows you could potentially lose all the data on your drive or partition. This is where BartPE comes in.

The Bart Pre-installation Environment is basically a cut-down version of Windows that lets you browse your drive and recover data from it. If you have a CD rewriter, you can install a disc burning plug-in based on the free program CD Burner XP Pro that will let you transfer lost files to disc. Bart PE provides a slow interface that isn't suitable for day-to-day computing but enables you to rescue lost files prior to a re-installation of Windows or before resetting your computer using recovery discs.

Start by downloading PEBuilder from **www.tinyurl.com/qh5bl** and install the program in the usual way. Put your Windows XP CD into your CD drive, browse to My Computer, right-click this drive and choose 'Explore'. Copy the i386 folder to the root of your C drive. PEBuilder will use these files to create the basic disc.

You'll also need CD burning software like CD Burner XP Pro. Download the plug-in from **www.tinyurl.com/58qcpx**. Double-click 'CDBurnerXP_Pro_PEBart_ Plugin.exe' and extract it to the 'PEBuilder3110a\plugin' folder. Install CD Burner XP Pro on your computer and browse to 'Program Files\CDBurnerXP Pro 3'. Copy all of the files, plus the Resources and AVI folders, into the Files folder inside 'PEBuilder3110a\ plugin\cdburnerxppro3'. Launch PEBuilder and set the source path to 'C:\'. For the Media output, select 'Burn to CD/DVD' and opt to auto erase RW. Click 'Plug-ins' and select 'CDBurner XP Pro' from the list and click 'Enable/ Disable' followed by 'Close'.

To create your BartPE recovery disc, click 'Build'. This generates the CD image and then burns it to your disc. Test this disc by restarting your PC and booting from it. You should now be able to use the pre-installation environment. This gives you an environment that's very similar to Windows. You can browse your hard drive using the file manager. To recover files, launch CD Burner XP Pro and copy them to CD or DVD.

There is a Vista alternative to Bart PE, which you can get at VistaPE (**www.vistape.net**). However, the XP version will enable you to boot a Vista machine and it provides a lot more tools and has lower overheads. If you have access to a copy of XP, we'd recommend Bart PE. Another alternative is to use a Linux live CD (see page 97) .

DAMAGED MEDIA

Physical damage can be a challenge. Some of the data will have been completely destroyed. Scratched CDs and DVDs can sometimes be restored by carefully polishing out the scratch, as long as it hasn't gone deep enough to damage the foil that actually holds the data. You can also try CD/DVD recovery software that checks and attempts to restore lost data on optical discs. CDCheck is available as a free trial from **www.kvipu.com/CDCheck/download.php**. Install the software and select the drive you want to check and follow the prompts. For recovery you'll need to specify an output folder.

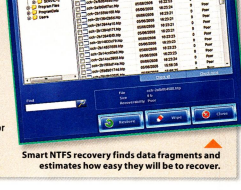
You may not be able to get a hard disk to spin up at all. In these cases you have little choice but to call in the experts. There are many data recovery services available, but Kroll Ontrack (**www.ontrack.co.uk**) has specialised in this area for many years. Physically damaged drives can be shipped into Kroll Ontrack's clean rooms for on-site recovery. These are similar to clinical laboratories. The dust-free environment vastly reduces the chances of damaging the data on the disk. Professional data recovery isn't cheap but is worth it if your data is valuable.

DO THIS... SMART NTFS/FAT RECOVERY

If you've lost a file, it helps if you already have recovery software installed. If you need to install a program on the drive where the lost data is stored you risk overwriting the deleted file with the new program data. It's best to be prepared before the event, or run the program from a different drive.

Smart PC Solutions provides two free recovery utilities that depend on the file system of the drive concerned. In most cases Smart NTFS recovery will be the one you want, from *www.smartpctools.com/ ntfs_ recovery/index1.html*, but if you're dealing with a FAT32 disk, you're better off with Smart FAT recovery, from *www.smartpctools.com/fat_ recovery/index1.html*.

Install and launch Smart FAT or NTFS recovery and select the drive you wish to search. In Vista you'll need to run the program as an administrator. Use the 'File or mask to find' box to narrow your search (click the downwards arrow to opt for specific file types). Click 'Find' and wait while your drive is scoured. A list of all files and incomplete data fragments will appear. To attempt to recover entire files, tick them. Click 'Options' to choose where to save the recovered file(s), followed by 'Restore'. If the files are recovered, try opening them to see if they're still intact. If a file can't be recovered, you may be able to extract some, most or all of the text. Select the file in question and click 'Preview'. If there's text you can use, click 'Save' to recover its contents as a fresh text file.



Smart NTFS recovery finds data fragments and estimates how easy they will be to recover.

Hide files from prying eyes

If you take your security seriously, Vista can help you sleep at night. *Jon Thompson* tucks you in.

REQUIREMENTS

- **WINDOWS VISTA**
  Any version will do.
- **MY LOCKBOX**
  A simple yet effective way of locking a folder. Download it from **www.fspro.net**.
- **MAGIC BOSS KEY**
  To hide windows, icons and the taskbar. Available from **www.magictweak.com**.
- **STEGOMAGIC**
  To hide data inside pictures, text or wav files (**www.gosoftware.com**).

INSIDE INFO

- Stegomagic is a simple but powerful steganography app: **www.stegomagic.tk**
- ImageHide by Dancemamal.com enables you to enter text and encrypt it in an image. It accepts a huge number of image formats, but will only write .bmp and .png files: **www.dancemammal.com/imagehide.htm**
- Magic Boss Key will immediately hide all running applications and remove them from the taskbar: **www.magictweak.com/freeutil/magicboss/magicboss.php**
- An extensive article about steganography, with plenty of resources: **www.securityfocus.com/infocus/1684**

There are times when it pays to be extra cautious about the security of your data. You might be planning a surprise party or trip for a loved one and need to hide the preparations, or maybe you're simply worried about security. Whatever the reason, both Windows Vista and various third-party utilities can help to set your mind at ease.

SETTING A FILE'S HIDDEN ATTRIBUTES

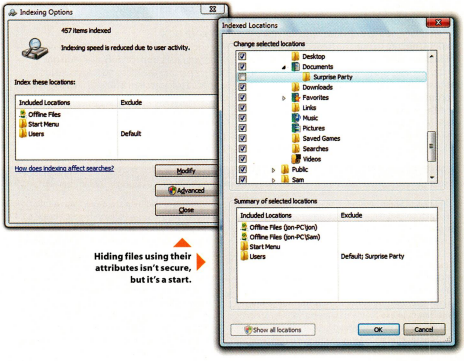
By default, Vista doesn't display hidden files or folders, and it's easy to change a file's attributes to 'hidden'. First, select the file or folder that you want to hide. Right-click on the file and select the 'Properties' option from the pop-up menu. A window with five tabs pops up. On the General tab, you'll see the Attributes section. Make sure that the Hidden tick box is selected. Now press the Advanced button, and if ticked, deselect the box marked 'Index this file for faster searching'.

Now dismiss the Advanced Attributes window and do the same to the File or Folder Attributes window. If you're making a folder hidden, a new pop-up window will appear, asking if you want to set the hidden attribute on all sub-folders and files, too. This is a good idea. It will protect any existing content if an administrator who knows the path into the top-level folder you're making invisible enters it by hand.

Notice that the file or folder doesn't actually disappear from view until you navigate away from the parent folder and press F5 to refresh your view. Once you do, everything you set to hidden disappears. The question is: how do you get it back?

VIEWING HIDDEN FILES

To see the files or folders you've hidden, open up the Control Panel. Click on the Appearance and Personalisation section and locate Folder Options. One of the options here is Show Hidden Files and Folders. Selecting this produces a pop-up window of file viewing options. Click the View tab and you'll see a list of advanced settings for file viewing options. On this list, you'll see the option Hidden Files and Folders. Under this are two choices, letting you either hide or show hidden files. If you can't see these options, click on the Hidden Files option to expand the view. Select the option to show hidden files and dismiss the pop-up before refreshing your view of the folder containing your hidden data. It should all now be visible to your account, while remaining hidden to others who don't have the Show Hidden Files option



Hiding files using their attributes isn't secure, but it's a start.

SPOTLIGHT ON... THE LAW

The police have ways of uncovering hidden, encrypted or even overwritten data to ensure that they can usually recover incriminating evidence from hard disks or electronic devices.

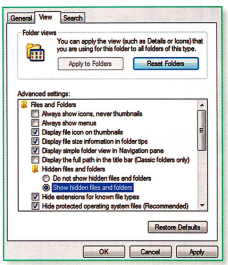
The roots of this skill lie in the art of data recovery. In the 1990s, police forces realised that crimes increasingly involved computers. They needed to find a way of recovering data which had been deleted by suspects, covering their tracks.

You can delete a file, but it still remains on the disk until the space is required again, making it easily recoverable.

You could use an overwriting utility to write random bits over the effected sectors, but new techniques that exploit microscopic errors in the positioning of the disk's read/write heads mean that it may still be recoverable by forensic labs.

You might reformat the drive lots of times, but if the drive controller previously decided a sector with incriminating data on it was about to fail, it will have quarantined it from use – including reformatting.

Destroying your hard drive by fire or with a large magnet is perhaps the worst way to make data vanish. Some companies have up to 30 years of experience in recovering data from drives damaged this way.



Showing hidden files again.

HANDY TIP

What's the good of hiding your data if others can see your surfing history, auto-fill information, cookies and so on? If you're using Firefox, the good news is that you can install the X (Paranoia) Mod add-on. With two key clicks, it clears your surfing tracks so that others cannot recreate your activities. Internet Explorer users can install Internet Tracks Washer, available from the Microsoft download site.

> MY LOCKBOX IS A FREE UTILITY THAT WILL SECURELY HIDE YOUR FILES FROM PRYING EYES

set and have read access to the parent directory.

You can also simply hide folders from the Vista Indexing Service so that the search function can't find them. To do this, enter the phrase 'indexing options' into Vista's Search utility. This will bring up a pop-up window of the same name. Now press the Modify button and another window pops up, detailing all of the locations on the hard disk that the indexing service includes.

Now we need to drill down into the disk's folder structure to find the folder that shouldn't be included in the machine's index. To do this, first press the 'Show All Locations' button at the bottom of the window. Accept the resultant User Account Control warning that interrupts you, and the window duly changes to include the local disk. Double-click on this icon and you'll see that it's a tree structure. Navigate to the folder that you want to remove from the indexing service and deselect its accompanying tick box to enforce this.

However, simply setting the hidden attribute on files and folders and then de-indexing them isn't a very advanced way to protect your very sensitive files — and what about hiding running applications? What we need is a more active solution. This is where third-party software developers can help out.

MY LOCKBOX

My Lockbox is a free utility that will securely hide your files from prying eyes. You do this by placing the files and folders inside a special folder called a lockbox. This remains hidden from all users and software on your system, including both the Administrator and System accounts. It also remains hidden from Vista itself. Without the password to open it, it's also impossible for other people using your account to see its contents.

Installation is very simple. You'll be asked to enter a password and hint to access your lockbox, as well as the location that you want your lockbox to reside in. By default, this is under your Documents folder. The only real problem with installing My Lockbox is that the last step of the installation process is an old school reboot.

When the system is up and running again, you'll see a My Lockbox desktop icon. You should remove this in situations where you think its presence may give others reason to believe that you're hiding something. On the Start menu, the My Lockbox program group gives access to your lockbox, as well as the My Lockbox Control Panel. Access your lockbox first.

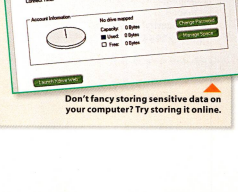
On doing so, you'll be asked for the password you entered and confirmed during installation. Entering it opens the lockbox in a window just like any other folder —

SPOTLIGHT ON... OTHER HIDING PLACES

The loss of important files or even identity theft could result from leaving data on an unsecure PC, even if it's only accessed, not stolen. So, as well as hiding your data, you could store it elsewhere.

First, you could use a USB memory device. These are very cheap and have the advantage of fitting into your pocket, so they're easy to hide. You could also store longer term data you need to update less frequently on a DVD-RW. Though they are slower to use than a USB memory device, they do have a large capacity and are very cheap.

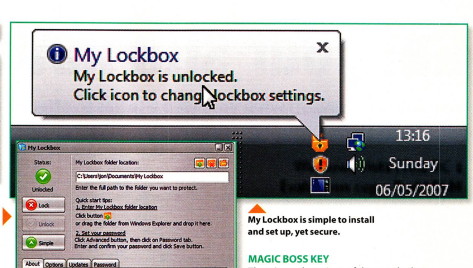
Another option is to use an online data storage service. You could then store your important or sensitive data in a safe place. If you do have your PC stolen, you still have all your data. This also applies if you upgrade to a new machine. One such online storage service is Xdrive (*www.xdrive.com*) from AOL. Xdrive will allow you to store up to 5GB of data online for free. To do so, first download and install the Xdrive Desktop client software. To use Xdrive, pick the folders you want to back up on a regular basis. At the appointed time, or by hand, they're uploaded to your Xdrive account. You can then delete the files, effectively hiding their existence.



Don't fancy storing sensitive data on your computer? Try storing it online.

HANDY TIP

While there are plenty of data-hiding utilities on the market, their capabilities mean that using an evaluation copy requires caution. If you hide and password-protect your files with a demo copy of a product and the trial period expires, you may have to pay for the full product to get your files back. Judging by some comments left on software download sites, this can come as a nasty shock.



The My Lockbox control panel that displays the lockbox's status.

My Lockbox is simple to install and set up, yet secure.

which technically it is. You'll also see a small bubble window and an open orange padlock icon appear on the taskbar and toolbar respectively, both of which are reminding you that the lockbox is now open.

To lock the lockbox again, simply right-click on the toolbar icon and select the option Lock and Quit. To hide the taskbar icon and control other aspects of how My Lockbox works, either left-click on the toolbar icon or access the My Lockbox Control Panel through the Start menu.

MY LOCKBOX CONTROL PANEL

My Lockbox's control panel displays the lockbox's status (locked or unlocked) and lets you lock and unlock it using the buttons on the left-hand side. Using the three icons at the top right of the screen, you can (from left to right) set the folder you want to use as your lockbox, delete it from the disk or open it.

In Vista, changing the location or deleting your lockbox seems to lock the Control Panel, but all is not as it seems. On your taskbar, you'll see a flashing task icon. Click it and accept the subsequent pesky User Account Control window, and the Control Panel will spring back into life.

Click the Advanced button and the Control Panel will expand to include a second section containing four tabs. The About tab simply allows you to download the latest version and send the developers feedback.

Now click on the Options tab. To access your lockbox in Windows Safe mode, click the first tickbox on this tab. To ensure that My Lockbox doesn't display the tell-tale toolbar balloon window when you unlock it, select the second option. You can also set a hot key sequence that will allow you to enter your password and get into your lockbox straight from the desktop. If you make any changes, remember to press the Save button and accept the resulting User Access Control.

The third tab enables you to poll for updates at a set interval. You can suppress the warning that My Lockbox is about to access the internet to poll for updates on this window, too. If others can easily overlook your screen when you're logged in, suppressing this warning is a good idea.

Finally, there's the Password tab. Enter your current password and this tab enables you to change it, as well as the password reminder question. After changing the password, remember to press the Save button, and then you can deal with the subsequent User Account Control window that will be waiting on the taskbar.

MAGIC BOSS KEY

There's one last piece of the puzzle that we need to cover: hiding running applications from the prying eyes of people who come up and surprise you at a moment's notice. Luckily, a free utility called Magic Boss Key by **www.magictweak.com** will enable us to do this. When you press both left and right mouse buttons together, it will hide your open windows. It also removes them from the task bar, from the Aero interface's 3D carousel and even from Alt+Tab. To get them back, simply press both mouse buttons again.

After downloading, installation is simple. Once complete, the Magic Boss Key configuration window pops up. The first pair of radio buttons enable you to switch Magic Boss Key on and off by pressing both mouse buttons or F12.

The first tickbox effectively enables or disables the utility. The two other tickboxes enable you to control the utility's ability to hide your desktop icons. The first makes it hide your applications and the second hides the taskbar.

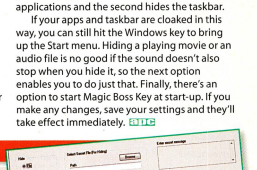
If your apps and taskbar are cloaked in this way, you can still hit the Windows key to bring up the Start menu. Hiding a playing movie or an audio file is no good if the sound doesn't also stop when you hide it, so the next option enables you to do just that. Finally, there's an option to start Magic Boss Key at start-up. If you make any changes, save your settings and they'll take effect immediately. UTIL

DO THIS... HIDE FILES WITH STEGANOGRAPHY

Instead of making files invisible or securing their parent folder with special software, what about hiding them in other files? Welcome to steganography. Stegomagic by Varun Suresh is a simple utility that demonstrates how this works. Simply unzip the program (from *www.gosoftware.com*) and double-click to run it. Next, decide on a carrier file type. A .wav or .bmp file will not change size when you hide data in it, but the length of a text file will. Now select a carrier file, enter a password to protect it, confirm, and enter a filename. Press Hide and the software does the rest.

Depending on its type, you can view or listen to the generated carrier file with no problem. In fact, unless you know there's a secret file stored within it, there's no easy way of knowing it's there.

To extract the secret file again, simply browse for the generated carrier file using the Select Carrier File (For Both Hiding and Unhiding) option, enter the password used to create the carrier file and a name for the extracted file in the Save Secret File (For Unhiding) box, and press Unhide. Stegomagic then extracts the hidden file and recreates it with the new filename.



Hiding sensitive files in pictures or 'wav' files is easy.

Get your site noticed

Now you can show off what your web site has to offer on the search engine page. *Neil Crosby* shows you a few tricks.

REQUIREMENTS

- **A YAHOO! ID**
  You'll need this so that you can save your Monkey and submit it to the gallery so other people can use it.
- **A WEB SITE CONTAINING STRUCTURED DATA**
  Microformats are good for this, but you can also use RDF or extract data using XSLT.

SearchMonkey is a brand-new tool from Yahoo! that allows site owners and developers to use structured data to enhance the search experience, making their search results more appealing than ever before.

Previously, after a web site had been created, you had very little control over what showed up for it in the search results pages. Now, with SearchMonkey, site owners have been given more control, at least with regular visitors. If you want to include an image to illustrate the type of information a page contains, you can. If you want to change the result text to something that describes the page more accurately, you can do that too. By opening up the Yahoo! search engine to site owners and developers, SearchMonkey gives you complete control over how your site appears.

The changes to the way the search results page works have been made possible by Yahoo! starting to index microformats and RDF encoded data on web pages. Out of the box, SearchMonkey will consume this data for you and then give it back as easy-to-use objects. If you haven't used microformats to describe your data, though, all is not lost — you can also use XSLT and XPATH to extract data.

DECIDING WHAT TO MONKEY WITH

For this example, we're going to build a Monkey to show off a Facebook user's main image and make that search result 'pop' off the page. The reason for using Facebook as our example is that Facebook's developers have already marked up the page using the hCard microformat, meaning that getting access to the data is incredibly easy. Even if the page hadn't been marked up in this machine-friendly way, we would still have been able to get at the data, but the process would have involved XSLT and would have made things a fair bit more complicated.

The moral of the story is that you should mark your data up so that machines as well as people can easily use it.

Now we get to the fun stuff — actually building a Monkey. Start by visiting the SearchMonkey Developer Tool homepage (**http://developer.search.yahoo.com**). Please note that developer tools are only available on the .com site. Sign in to your Yahoo! account if you're asked to and then click on the 'Create a New Application' link near the top of the page.

The first page you're greeted with is fairly simple — just give your Monkey a name, maybe give it a description and choose an icon. Choosing an icon is really important, as it will be seen below any search result that is Monkeyed with. Even if you do little else to visually engage the user, the fact that your Monkey has an icon will draw their eye to it. The icon can also be used to provide brand recognition to your Monkey. A nice touch with the tool is that you can simply upload the favicon from your site and SearchMonkey will automatically convert it into a format that's usable on the search results page.

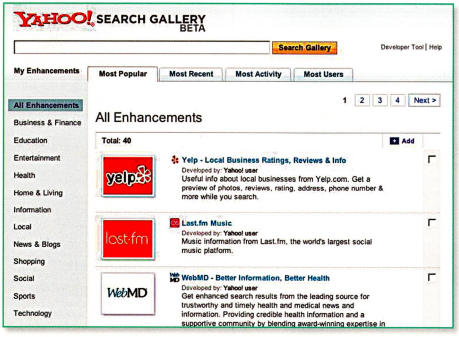
Once you have finished setting up all the basics of your Monkey on this page, agree to the terms and conditions and then click the 'Next' button.

TRIGGERING RESULTS

Since we want our Monkey to enhance the search results of Facebook profile pages, we'll set the trigger URL pattern on the next page to '*.facebook.com/ people/*'. This will apply itself to any page under the 'people' directory on **www.facebook.com** and all of its sub-domains. After setting the trigger, click on the 'Auto Find URLs' button and SearchMonkey will find you 10 URLs that match that trigger, so that you can test your Monkey. It's worth bearing in mind here that the first URL in this list is the one that will be used to produce a preview of your Monkey in the gallery, so you might want to enter something manually for it.

Pressing the Next button again takes us to

Once you've shared your Monkey you can send all your users to its gallery page so that they can add it to their search results.





SearchMonkey gives you access to any microformats it can find — plus any data services you've set up.

SPOTLIGHT ON... MICROFORMATS

Microformats are really easy to use. Designed for humans first and machines second, microformats are a set of simple, open data formats built upon existing and widely adopted standards. What this means is that by adding a few well-defined classes to your existing mark-up you allow machines such as Yahoo!'s search agent to read your data and actually understand what it means.

Microformats exist to mirror several real-world concepts, such as the vCard, calendar event, review and the Atom format for marking up blog entries. Adding this small amount of invisible mark-up allows third-party sites and software to do much more with this data than if it was simply a paragraph to be scraped from the site, from displaying contact information in an easier way, to automatically processing program functions like SearchMonkey's web site displays.

For more information on microformats, go to *www.microformats.org*.

the Data Services page where we can see two services: 'Default' and 'Feed: com.yahoo.uf.hcard'. The default service is always available within SearchMonkey and contains the information that's normally used to create the Yahoo! search results. The hCard feed is also shown in this case because Facebook marks up their profile pages with the microformat, making it easy for SearchMonkey to access that data. Make sure both services are checked and press the Next button.

The Appearance page that we've now arrived at looks a bit more daunting than the previous pages, but really it's just as friendly and easy to use as the others. In the main column of the page you can see a PHP function that is used to return an array of data that describes how the search result should be displayed. The right-hand column shows the data that is able to be included in the result. Changing the PHP output is as simple as putting your cursor in the right place and clicking on a piece of data on the right of the screen.

Since the aim of our Monkey is to add the user's image to the search result, we're going to change the value of the '$ret['image']['src']' portion of the array. Find that line and delete the value SMDEFAULT from it. Leaving the cursor on that line, click on the 'com.yahoo.uf.hcard' link in the right-hand column, and then on the '@resource' under 'vcard: photo' in the section that appears. Notice that a Data::get() function call appears in the text box, and make sure that the line still ends with a semi-colon. Click Save and Refresh and marvel as you see the user's image appear.

Even though this required very little work, these profile results will now stand out for users who have this Monkey installed. With a bit of thought this Monkey could be made a lot more interesting and contain even more data.

If you want to add to this Monkey, there are several things that you can do. For example, you could use a regular expression to access the user ID on the end of the Facebook URL and then use that to create other URLs that could, for example, add or message that user. You could then add those URLs to the $ret['links'] to create deep links into Facebook.

PUBLICISING THE MONKEY

Since you've gone to the effort of creating a Monkey, you're going to want other people to use it and enhance their own search results. On the final page of the Monkey-building wizard, you're given the chance to 'Make the latest version of your application sharable'. Click on this link.

For now we're just going to publish the Monkey so that we can share the link with our users, but if you make something good you should submit your Monkey for inclusion in the gallery. Having your Monkey in the SearchMonkey gallery will allow a lot more people to see and install your Monkey, and that's got to be a good thing.

Once you click the Next step button you'll be given a link to a URL that your users can visit to activate the Monkey on their own search results. For further information on Yahoo! SearchMonkey, go to **http://developer.yahoo.com/searchmonkey**.

DO THIS... GET ACCESS TO MORE DATA WITH XSLT

It's still pretty easy to access data that's not marked up in a way that SearchMonkey understands. For example, the Facebook profile page includes links to a few of the user's friends. Since these links aren't marked up in a microformatted way, SearchMonkey is unable to automatically expose them to us. Instead, we'll have to write a Custom Data Service.

From the SearchMonkey Developer Tool homepage, click the 'create new data service' link, give the service a name and click the 'Next' button. Give the same trigger URL pattern as before (*.facebook.com/people/*) and press Next again.

Replace the example item node that SearchMonkey provides with the following XSLT:

```
<xsl:for-each select="// table[@id='public_
grid']/td">

<item rel="rel:Person" resource="{.//a/@href}">

<meta property="vcard:fn"><xsl: value-of
select=".//a/img/ @alt"/></meta>

</item>

</xsl:for-each>
```

All being well, when you click Save and Refresh you'll immediately be able to see all the example user's friends' names.

The URLs will also appear in the preview panel. Go back to the SearchMonkey homepage and then edit your previous Monkey, going straight to the Data Services page.

If you click on the 'Add more data services' link you'll see that the service you just created will be available. Add it as a new service and you'll be able to use it in the same way you used the built-in hCard service earlier.

Create 3D movies, part 2

Last issue, *Jon Thompson* showed us how to build the set. Now it's time to begin directing.

REQUIREMENTS

- **ANTICS 3D**
  A free, professional machinima production package.
- **SKETCHUP**
  Google's free object modeller.

IN THIS SERIES

- **September '08**
  In part one of our machinima tutorial series, we introduced you to Antics 3D and showed you how to create, light and dress a simple set.
- **October '08**
  We explore creating and directing the characters, dialogue and action for your movie.
- **November '08**
  We'll show you how to film the action, add sound and edit it into a finished work.

INSIDE INFO

- Download the free Antics 3D Basepack here:
  www.antics3d.com
- Download Google's free SketchUp object modeller here:
  http://sketchup.google.com
- With SketchUp installed, you can download thousands of free models directly into it from the Google 3D Warehouse:
  http://sketchup.google.com/3dwarehouse

After building a set and dressing it with props, our next task is to learn to direct individual characters to interact with their environment and any props it contains. This may be as simple as picking up a glass and drinking from it or as complex as a room full of people having an argument. We also need to give characters lines to say. Luckily, characters in Antics are artificially intelligent enough to make your role as a director a lot easier.

BASIC DIRECTION

First, create a simple set. Create a second room next to the default and make it about 6 x 4m. Place walls on the side and back edges of the room and place a door in the middle of the connecting wall.

Now add a character and place them in a room. Select the 'Direct' button on the Active Object toolbar and run the cursor over the floor of the other room. A red bullseye will follow the cursor around the floor. Left-click, and the character will walk towards the door. Their onboard AI ensures they know how to open, walk through and close it before going to the point you indicated.

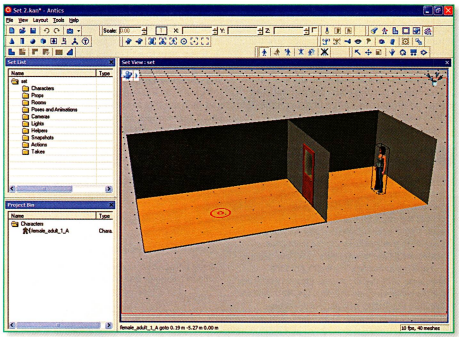
Let's give your character something to avoid. Put them back in the other room and press the 'Create No Go Area' button on the Room menu bar. Create a small no-go area in the middle of the second room's floor space (it's the same as defining the floor of a new room). This area will become invisible. To see it, press the 'Display Floor Plan' button and it will show up in dark blue.

Now select the character and direct them to walk to the other side of the other room again. After closing the door, your character will walk around the no-go area to the position you indicated. Use no-go areas to mark out sets so that characters don't try to walk through props. As they make their detour, you'll see the path they've calculated displayed on the set floor.

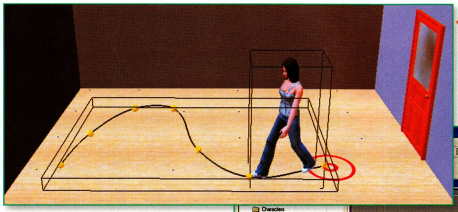
We can also direct the character to walk to a spot and face a certain direction. Select the 'Create/Edit Floor Marker' tool on the shape toolbar. Click a point on the floor and hold the left mouse button down to see a compass. This enables you to set the direction the character will face. If you now select the Direct tool again and direct your character to walk onto the floor marker, you'll see them turn to the direction indicated when they arrive.

WALKING A PATH

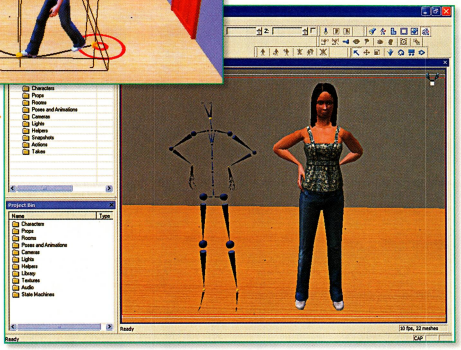
There are times when the paths that the characters calculate aren't appropriate. Because of this, we can define a path for them to walk. We do this with the Create/Edit Path tool on the Objects menu. Make sure you're displaying



The basic set upon which our characters will strut their stuff.



The floor plan shows the direction of a character along a path.



Save a new pose and you can recall it at any time.

HANDY TIP

If you import a model to use as a character by mapping it onto an existing Antics character (see 'Create custom characters', page 106), make sure that it hasn't had all its sub-objects merged into one. You need to be able to access these sub-objects and attach them to sub-objects in a regular Antics character. You can check this by loading it into SketchUp.

helper objects, then click on the floor wherever you want the path to start and make subsequent clicks to add points to the growing path. As you go, you'll see the corners smoothing out. When you reach the end, right-click and select 'Finish Path'.

Now, with your character selected, click on the Direct tool and place the red bullseye cursor on the start of the path, which becomes highlighted by a box. Click the mouse button, and the character will walk to the path then follow it to the end.

You can add points by selecting the Create/Edit Path tool again and right-clicking on the path where you want the new point to appear. Now select the 'Add Point' option on the context menu. You can also edit points on the path by selecting the Create/Edit Path tool again and clicking on a point. Two white edit points appear, separated by a black bar. You can pull and push these edit points around to modify the curve the path takes through the point being edited, or drag the point itself to a new position entirely.

If you right-click a point, you can also change its type. If you make it a smooth node, as you move one of the white edit points in towards the point, the other will change in proportion. If you set it to a straight point, the edit points become independent.

And if you set it to a corner point, the curves you create will be sharper than usual. You can also reposition, rotate and scale a path as a whole. Right-clicking also gives you the chance to hide it from view without turning off all the other helper objects.

POSING AND ANIMATING

You can pose a character in pretty much any way

DO THIS... IMPORT GOOGLE 3D MODELS

Though the Antics site contains some useful free content, the latest software release also has the ability to import free models directly from Google 3D Warehouse.

What's even more impressive is that many models are of real places, so you can set your machinima movies in recognisable locations.

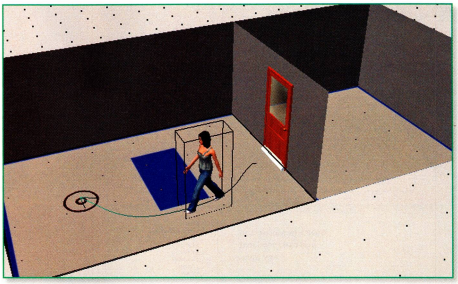
On the File menu, select 'Google 3D Warehouse' to open a minimal web browser on the Warehouse. Browse to a model you like, click on it to see it in detail and press its 'Download Model' button.

Once downloaded, a pop-up window asks if you want to import it to the set you're working on, save it, or close. Select the first option and set the scale. The import will proceed in the same way described last issue in 'Import objects and textures'.

Some of the bigger, more complex models, such as Rome's St Peter's Basilica, will chew up your CPU and RAM as you navigate around the set. However if you use 3D Warehouse objects to dress your sets with carefully selected items, you'll never run out of inspiration.



Import Google 3D Warehouse objects to shoot scenes in real places — like Wembley Stadium.



Characters calculate paths to avoid no-go areas.

HANDY TIP

A storyboard is a sequence of sketches and notes visualising the entire production, broken down by scene and shot. This should be begun early and forms a vital part of the filmmaking process. The storyboard for a feature film can be several hundred sketches long.

You're going to shoot a scene next issue, so in the meantime, as well as experimenting with Antics, it's a good idea to create a set and a storyboard of your own.

you like by selecting the sub-objects that make up their body. First, turn off the Snap Position and Snap Rotation options, then zoom in on the character and select the Move/Rotate Object tool. With the character selected, press Tab to enter sub-object mode.

You can now select a part of the character's body — such as a forearm — and rotate it in three dimensions. Nodes such as hands can also be moved as well as rotated, even right down to an individual finger.

To help you fine-tune the positions, you can use the X, Y and Z indicators on the Transform toolbar to rotate and move all body parts accurately.

You can use page up and down to step through the body parts. If you still have problems selecting the right one, press 'Display Skeletons' on the Display toolbar. This displays the underlying skeleton and makes sub-objects easier to select.

Save the pose so you can have the character assume it later by first pressing Tab if you're still in sub-object mode. Now right-click and select 'Save Pose'. In the set list, under Poses and Animations, you'll see a new pose, which you can rename.

> INTERACTING WITH OBJECTS SUCH AS DOORS CAUSES CHARACTERS TO PERFORM ACTIONS

Direct the character away from their current position, and a mannequin is left behind in the pose you just saved. If you can't see it, switch on helper objects. You can move and rotate the pose like any other object. You can also adjust its sub-objects, but don't forget to save it again.

When you want a character to assume a pose, switch on the display of helper objects and either copy and paste or drag the original pose to their position. Select the character and either use the 'Snap to Object' tool or the 'Blend to Object' tool to make an instant change to the pose or a smooth transition. Either way, selecting the pose makes the character assume it. There are also plenty of predefined actions (poses and animations) for your characters. They can be found in the Local Warehouse of the Content Viewer, under Animations. When you select one, a mannequin appears in the preview pane. Press the play button to animate it.

To make an animation available to the characters in the scene, simply drag and drop it into the Set View window. Select the character and click on the Play Animation tool. A window pops up listing all the animations available to the scene. Select one, and the character immediately begins to carry it out.

FETCH AND CARRY

Interacting with objects such as doors causes

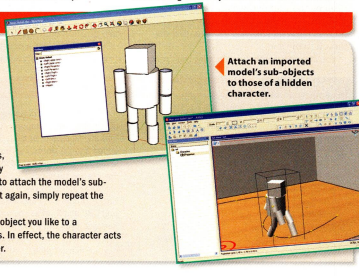
DO THIS... CREATE CUSTOM CHARACTERS

Unlike Antics characters, the models you import are just dumb props. To animate them, use the Attach/Detach Object tool to map an imported object's sub-objects onto an Antics character's corresponding limbs. Place the imported model where the character is on set, make the character hidden and give it direction, and the imported prop will come alive.

Import the object you want to use into SketchUp and make components of each sub-object (see SketchUp's Help option for details). Save the model and select it to import in Antics. But before importing, select the Hierarchy tab. Set the nodes and groups of nodes that make up limbs, hands and so on, to props by right-clicking each, and selecting 'Group As Prop'. This makes the prop's sub-objects accessible to the Attach/Detach Object tool.

Once imported, create a character and select one of the prop's sub-objects. Click on the Attach/Detach Object tool and hold down the Ctrl key. Move the cursor to one of the character's limbs, and it will automatically select itself. Left-click to attach the model's sub-object to it. To detach it again, simply repeat the attaching procedure.

You can attach any object you like to a character's sub-objects. In effect, the character acts as an unseen puppeteer.



Attach an imported model's sub-objects to those of a hidden character.

SPOTLIGHT ON... MAKING EYE CONTACT

You can have characters take an interest in events by making them look at props or other characters, and they can do so in two ways.

First, you can have a character orient their head to wherever a target is. Secondly, you can have them track the other character with just their eyes.

First, create a second character and a track for them to walk along that will take them past the first character's position. Now select the first character and click on the Look at Object tool.

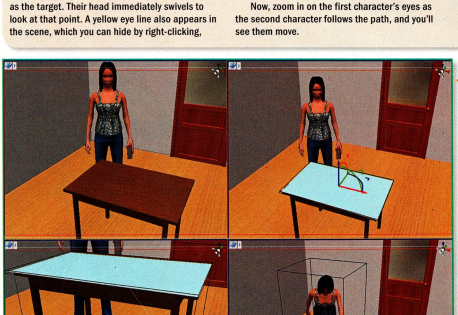
Select a point on the second character's body as the target. Their head immediately swivels to look at that point. A yellow eye line also appears in the scene, which you can hide by right-clicking, selecting 'Display' and the sub-option 'Targets'. Now have the second character walk their path and watch how the first character turns their head towards them. To stop this, select the Look at Object tool, and click on the first character to break the link.

You can have the first character follow the second around the room with just her eyes using the Eyeball Object tool. Again, select the first character, select the tool and select the second character as the target.

Now, zoom in on the first character's eyes as the second character follows the path, and you'll see them move.



A character can follow another around the set with her gaze.



To define a surface, create a small room, elevate it to the right height, attach it to the imported table and it's ready to use.

characters to perform actions. These actions are called 'state machines'. To demonstrate, add an armchair from the Furniture category in the Content Viewer, select the Direct tool, and place the cursor over the chair. The chair becomes highlighted. Click the mouse button and the character will walk over and automatically sit down. A dining room chair will cause them to pull it away from the table before sitting. Picking up and putting down many props also triggers the use of their associated state machines, and there's a special tool we use to invoke them.

Add a small prop to the scene and place it on the floor. Click on the character and select the Pick Up Object tool from the Active Object toolbar. The cursor changes, and if you click the left mouse button to select the prop, the character bends to pick it up. Notice that when the character is holding a prop, the Pick Up Object tool becomes the Put Down Object tool. The cursor will highlight all appropriate surfaces that will support the prop when put down. But, what if you have, say, a table in your scene that Antics doesn't know is a surface?

This is a common problem with imported objects. The way to solve it is to attach a surface, and we can do this easily. Let's assume you've imported a table from the Google 3D warehouse. First, position the camera looking straight down on the table. Next, create a small room, using the table top as a template for the size. Now switch to an angled view and raise the new room from the floor to just cover the table's top. With the new room still selected, click on the Attach/Detach Object tool on the Commands toolbar. This effectively tells Antics 3D to attach the selected object to whatever other object you now select. Select the table, hide the new room and have the character walk over to the table and deposit the book on it.

HANDY TIP

When you pose a character's limb, they move according to inverse kinematics. It's as if the parts of the limb were really joined. For example, select a wrist and move it around and the rest of the arm will pivot about its axis like a real one. And in the same way as a real limb, if you pull it too far it won't just stretch like elastic.

SPEAKING PARTS

Finally, we need to tell our characters to speak their lines. To import audio to Antics, open the Audio category in the project bin, right-click and select 'New'. A file dialog opens allowing you to import a '.wav' file.

To have the character speak, select them and click on the 'Say' tool. Select an imported clip from the pop-up list and it not only plays but the character's lips are synchronised to the sound. You can add sound effects in the same way, but both sound effects and dialogue happen at specific times, and so that's where we're headed next month — developing a timeline of events, filming and editing the action, and outputting the scene to disc. CTTC



Build Your Own Security Lab

For anyone in the IT industry who works with — or cares about — security, this is a great compendium of IT security knowledge. Learn how to assess your needs, gather the tools and collect the necessary software and hardware to create a controlled environment in which you can experiment, test and develop a range of security solutions. With plenty of examples from real-world scenarios and a free DVD full of demo software, plus a bootable Linux and tools for building and implementing your own security solutions, this how-to guide is a must-read.

CONTACT Wiley
ISBN 978-0-470-17986-4
PRICE $50
VERDICT ★★★½☆

Kodak EasyShare M820 Digital Frames

Digital picture frames have really become the must-have item lately, with the latest generation featuring a raft of new features. Kodak has released the EasyShare range in 8in and 10in multimedia versions that allow playback of most video types and the inclusion of MP3 capability through built-in speakers. With enough slots to handle the most popular memory card formats (CF, SD, MMC, xD and MS), the M820 and M1020 also boast 128MB of internal memory, which can hold up to 300 pictures. What started out as a simple photo frame has morphed into a home entertainment centre.

CONTACT Kodak
ONLINE www.kodak.com.au
PRICE $299
VERDICT ★★★★☆

STM Slip

One thing every notebook owner on the go needs is a way of keeping their favourite toy (or business tool) safe. STM has come up with an easy way to protect your notebook and make it comfortable to use at the same time. The 'Slip' is a one-piece padded bag with a single zipper that allows it to be folded out flat while still being attached to the notebook, thus doubling as a padded cushion and providing a heat shield for your dangly bits when placed on your lap. With a range of sizes to suit notebooks from 13in to 17in, the Slip is bound to appeal to most users.

CONTACT STM
ONLINE www.stmbags.com.au
PRICE $79.95 for 15in
VERDICT ★★★★☆

HTML, XHTML & CSS For Dummies

Anyone who has read a Dummies book knows that they are a great and easy way to learn. With expansive in-depth coverage of CSS, scripting, syndication, podcasting and sample HTML projects to get you started, *HTML, XHTML & CSS For Dummies* includes a personal web page, an eBay auction page, a company web site, and an online product catalogue with references and information on commands, syntax, colours and more. This is the most thorough, simplest and cheapest way to learn how to design, build and maintain your own web sites.

CONTACT Wiley
ISBN 978-0-470-23847-9
PRICE $29.99
VERDICT ★★★½☆



Laser Intermate 8GB Video MP4 player

Packed full of features including a good-sized 3in screen, FM Radio, inbuilt microphone with voice recording capability and an SD card slot for easy uploading and additional memory, this is one gadget that makes you seriously consider chucking out your iPod. The Laser Intermate acts like any other USB device, with a simple drag-and-drop method of adding files without the interference of any iTunes-type software. With an easy-to-use menu system and an insanely sharp screen, the Intermate is an impressive (and cheaper) alternative to its over-hyped competitors.

CONTACT Laser
ONLINE www.laserco.net
PRICE $199
VERDICT ★★★★½

10,000 BC Blu-Ray disc

Cavemen films can be hit and miss, with the audience for *10,000 BC* being divided down the middle on this one. With shamans, magic and an other-worldly feel about it, *10,000 BC* cannot be described as historically accurate. If you're willing to forgo believability and just get lost in a story, then you will find *10,000 BC* to be an enjoyable and visually impressive adventure. If, on the other hand, you like a little more substance from your cinema, then this may not please. Despite its flaws, *10,000 BC* makes for a braindead but overall enjoyable piece of escapist Blu-ray viewing.

CONTACT Warner Brothers
ONLINE www.warnermovies.com
PRICE $44.83
VERDICT ★★★☆☆

Numark Portable USB Turntable

No special drivers are needed to connect the PT-01USB to any Mac or PC via USB and transfer music from vinyl to hard disk. Just plug it into a USB port and EZ Vinyl Converter 2 will import your songs directly into your iTunes library, automatically separating tracks, and with a free added software download you can even automatically name your tracks and edit them to reduce clicks, pops and other noises from your recordings to restore the full quality of your vinyl. Now all you have to do is explain how all that sad '80s music came to be on your iPod in the first place.

CONTACT Numark
ONLINE www.storedj.com.au
PRICE $239
VERDICT ★★★★½

ASUS Eee PC Stick Wireless gaming

Not content to turn the world of portable computing upside-down with the creation of the Eee PC, ASUS has now decided to try and emulate the success of the Nintendo Wii console by bringing motion-sensing technology to the PC. These familiar-looking wireless controllers are comprised of an Activation stick, a Navigation stick and a 2.4GHz RF dongle and are compatible with any PC. The units work in exactly the same way as the Wii and will come bundled with a set of original games on purchase. We can only hope that it's just a matter of time now before Mario goes cross-platform.

CONTACT ASUS
ONLINE www.asus.com.au
PRICE Approx. $70 (TBA)
VERDICT ★★★★☆

Battlefield: Bad Company

***Troy Coleman* makes everything explode.**

As soon as we heard that, as well as the usual intense multiplayer action, Battlefield: Bad Company includes a single-player campaign and the environments are at least 90% destructible, well, needless to say we were foaming at the mouth in anticipation.

As Private Preston Marlowe, you have just been reassigned to the highly expendable B Company: a team of misfits and jokers who are called on to complete any mission that is non sanctioned or not worth wasting actual troops on.

If you've played the previous



Battlefield titles or any other first-person shooters, you pretty much know what's in store for you. Objective-based missions are completed via ambling across open country fields and towns, relentlessly killing enemies with an assortment of the usual weapons and a couple of trick shots thrown in. What sets Bad Company apart from the competition is the engine its mechanics are built upon. With the 90%-destructible environs, it is, unsurprisingly, a hell of a lot of fun to pick up whatever weapon makes the biggest boom and take the straightest line possible to a given objective.

As fun as single player is, the real strength of Bad Company still remains in its online multiplayer. The classic Conquest game mode is there, as well as the new Gold Rush, which sees players attack or defend a cache of gold.



AVAILABLE PLATFORMS: ~~PC-DVD~~ | ~~Wii~~ | PS 3 | ~~PSP~~ | XBOX 360 | ~~NINTENDO DS~~

CONTACT Electronic Arts

ONLINE badcompany.ea.com/

PRICE $99.95

✔ Blow everything up; strong multiplayer action.

✖ Graphics aren't fantastic.

VERDICT ★★★★☆

Guitar Hero: On Tour

***Peter Dockrill* attempts to shred his handheld Strat.**

It's fair to say that the launch of Guitar Hero in 2005 truly changed the gaming landscape. With its simple and addictive gameplay formula, canny licensing of real-world rock anthems (new and old) and the ingenious innovation of a guitar-shaped controller peripheral, Guitar Hero arguably created the first truly successful mainstream hybrid of video game and rock music. Now, several years, sequels, spin-offs and imitators later, it's been ported to a handheld: instead of plugging in a guitar controller, players affix a 'Guitar Grip' to their console, while strumming the DS's touchscreen with a special stylus shaped like a guitar pick. And does the result rock? Well, no. While all the software elements of GH's winning formula are present (addictive rhythm-based gameplay, catchy tunes, unlockables etc.), the act of doubling over your DS and squinting at the zipping notes while you delicately pluck against the touchscreen simply can't come close to the unabashed faux rockstar joy of shredding away in front of your TV. By miniaturising everything, GHOT has negated the sensation of playing a guitar — and that's what it was all about, man.

AVAILABLE PLATFORMS: ~~PC-DVD~~ | ~~Wii~~ | ~~PS 3~~ | ~~PSP~~ | ~~XBOX 360~~ | NINTENDO DS

CONTACT RedOctane

ONLINE www.guitarheroontour.com

PRICE $89.95

✔ Closest DS owners will get to rocking out.

✖ Sadly, lost in translation.

VERDICT ★★★☆☆

Echochrome

***Troy Coleman's* feeble mind can't cope with abstract rules.**

At a time when most games are eagerly trying to blow people's minds with slick, highly polished graphics, Echochrome sneaks onto retail shelves with the direct intention to melt minds and challenge the way we view gaming.

Echochrome's environments are inspired by MC Escher's bizarre rising, falling and gravity defying perspective drawings. The goal is to rotate the pseudo 3D environments to guide a mannequin to collect echoes (other mannequins) while navigating potholes, launch pads and enemies. What makes the gameplay such a mind twister are the five basic laws of perspective: if two paths appear to be touching, they are; if one path appears to be above another, it is; when a gap between two paths is blocked from view, the gap no longer exists; when a hole or jump is blocked from view, it no longer exists; when a mannequin jumps, it will land on whatever appears to be beneath it.

On top of the 56 levels, users can create and share levels of their own. All up, Echochrome is a fantastic change of pace for anyone seeking something a little different.

AVAILABLE PLATFORMS: ~~PC-DVD~~ | ~~Wii~~ | PS 3 | PSP | ~~XBOX 360~~ | ~~NINTENDO DS~~

CONTACT Sony

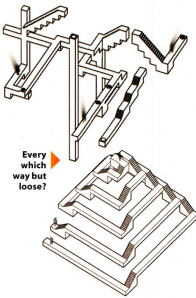
ONLINE http://au.playstation.com/

PRICE $49.95

✔ Simple, elegant, mind-melting puzzler.

✖ Level creator not immediately simple.

VERDICT ★★★★½



Alone in the Dark

***Troy Coleman* hums "There's no aphrodisiac like loneliness".**



Not only alone and in the dark but befuddled by poor controls to boot!

We love survival horror, so it was with equal parts excitement and bloodlust that we awaited the release of Alone in the Dark (AitD).

Protagonist Edward Carnby wakes sightless with amnesia, trapped in a building amid supernatural events. Regaining his sight, Edward makes his way to Central Park, where the full mystery behind the strange occurrences waits to be unveiled.

Like other titles in this genre, progress is made by solving puzzles, exploring and killing a bunch of stuff, all of which involve the use of fire, which is generated in real time and looks excellent. Useful objects are left in convenient places ready for pick up and storage in the quirky and excellently designed inventory system.

Levels are designed to be episodic and digested, not unlike TV, in small doses. Loading in the game after taking a break brings up a 'previously in Alone in the Dark…' cutscene to quickly bring you back up to speed. But by far the most interesting (read: odd) feature is the fast-forward function. If a section is too hard it's a simple process to skip past to the next scene or chapter. Even the end credits!

The truly unfortunate aspect of AitD is from a purely technical standpoint. Quite simply, the controls and viewing angles are rubbish and are constantly a frustrating immersion breaker. If you can get over that, then AitD isn't too bad an outing. (Probably best to rent it though.)

AVAILABLE PLATFORMS: PC-DVD, ~~Wii~~, ~~PS 3~~, ~~XBOX 360~~, ~~NINTENDO DS~~

CONTACT	Atari
ONLINE	www.centralark.com
PRICE	$63.95-$99.95
✔	Fire looks amazing; neat inventory.
✖	Controls are broken.
VERDICT	★★★☆☆

Buzz!: Quiz TV

***Christopher Zammit* answers a question concerning online quizzes.**



Buzz! is back — and now it's available on the PS3.

Now, we've all sat in front of the television and sneered at gameshow contestants as they've struggled to answer simple multiple choice questions and thought, "These questions aren't that hard. I can do better than that!" Buzz!: Quiz TV gives you the chance to put your money where your mouth is, testing your knowledge with over 5,000 questions across five category channels including music, movies and TV, sports, knowledge and lifestyle.

After you've chosen a player, clothing colours, buzzer sound and have finally concocted a thoroughly disgusting name for yourself, the real fun can begin. Each game lasts around 20 minutes with five rounds in each. The game-pack comes with a set of four wireless controllers with a big red buzzer you can whack away on just like you were on a TV show.

Players are also able to write and upload their own personalised quizzes for download by other players across the world. Then, thanks to the online abilities of the PS3, players can team up with friends and family and take on groups of like-minded players anywhere on the planet, taking part in Sofa vs. Sofa multiplayer-gaming after logging on to the PlayStation Network. This is an appealing concept; not only can you find out if you're the brainiest on your sofa — you can pinpoint how you rank against others around the world.

For an average price ($109.95 with the four controllers), Buzz is guaranteed to fill your loungeroom with laughter and provide fun adult gaming for months to come.

AVAILABLE PLATFORMS: ~~PC-DVD~~, ~~Wii~~, PS 3, ~~XBOX 360~~, ~~NINTENDO DS~~

CONTACT	Sony
ONLINE	www.buzzthegame.com
PRICE	$109.95 with controllers
✔	Variety of questions; heaps of fun.
✖	Game format can be repetitive.
VERDICT	★★★★½

WiiWare

***Peter Dockrill* goes online in search of new challenges.**

A few months ago, we profiled the Wii Virtual Console (APC August, page 113), whereby Wii users can download cheap-as-chips classic gaming titles by redeeming pre-purchased Wii Points.

WiiWare offers the same kind of deal, only, this time around, everything on offer is brand-new. While the Virtual Console strictly trades in retro arcade games, WiiWare offers a portal to newly developed titles, significantly lowering the entry barrier for independent developers.

So what of the games?

AVAILABLE PLATFORMS: ~~PC-DVD~~, Wii, ~~PS 3~~, ~~XBOX 360~~, ~~NINTENDO DS~~

CONTACT	Nintendo
ONLINE	www.nintendo.com.au
PRICE	From 500 Wii Points
✔	Lots to choose from; cheap.
✖	Will the portal lend itself to truly substantial titles?
VERDICT	★★★½☆

Well, there's a mixture of genres and styles on offer, ranging from arcade to puzzle to quiz games and more, and pricing varies.

We tried out two: LostWinds and the imaginatively titled Wild West Guns. The former is a lush Zelda-esque side-on platformer which has you controlling your character with the power of wind. More immediately engaging, but offering less long-term value, Wild West Guns is a predictable western shooter but fun all the same.

All up, for $15 each, you can't really go wrong. While it remains to be seen whether WiiWare develops to offer truly substantial gaming titles, this is certainly a promising start.

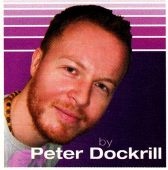


WiiWare offers cheap and quick downloadable gaming choices.



LostWinds is a promising first-rate launch title.

chip chat



by Peter Dockrill

FACEBOOK FRACAS



Just when you thought all the hype and controversy about social networking sites was dying down, along comes the stunning development that *Facebook encourages violence*. UK tabloid rag *The Sun* broke the story that popular Facebook app SuperPoke promotes teen violence by enabling users to "shank" (slang for 'stab') one another, calling it a "SICK game [where] kids STAB each other." SuperPoke, a third-party app from developers Slide, comically extends the Facebook concept of 'poking' by enabling users to interact with one another by figuratively 'kissing', 'groping', 'irritating' and 'drunk-dialling' them. Slide responded to the accusations by removing the action from the game, acquiescing that the violent "shank" manoeuvre (accompanied with a cartoon knife icon) "misrepresent[ed] the SuperPoke! brand." Whether it's still kosher to 'kidnap', 'throw a sheep at' or 'roundhouse-kick' one of your online amigos had not yet been authoritatively determined at time of writing.

We couldn't find any hi-res pictures of the Olympics fireworks, so we stole Beijing's idea and have faked up our own. Enjoy!



Liar, liar pants on fire!

Straight from the 'looked too good to be true' files (and as you may have heard on the news) comes the bizarre revelation that fireworks shown in the Beijing Olympics opening ceremony TV broadcast were *faked*: organisers used CGI to animate a 55-second sequence in which firey footprints trailed across the sky. According to Chinese spokesmen, concerns over aerial photographer safety (and that not all the shots in the sequence would be captured perfectly) led to the decision to employ a visual effects team for almost a year to (re)create the display digitally. The same fireworks were in fact let off in real life; it's just that the ones the TV audience (of over three billion people) saw weren't the real deal, with the effects people even incorporating artificial smog and camera shake to make the illusion convincing. Sure — it says a lot for the technique of the animators, but what a gyp!

Stars of the silver screen

If you've been pining after the sleek silvery curves of a new MacBook Air but find that you can't quite justify the cost (or compromises) of the device, then we may just have a solution for you: this Nintendo DS running Mac OS 6.0.8 (from *www.tuaw.com*). On the bright side, the DS body is just as silvery as the Air, it's got just as many hardware limitations, and it's even lighter and smaller to boot (heck, you can fit it in your back pocket). On the down side, unless you've been stuck under a fridge for the past 20 years (and missed out on all the intervening developments in personal computing), Mac OS 6.0.8 probably isn't destined to rock your world. Still, it could be worth considering for the budget-conscious of APC readers out there! apc

Redefining portable computing? Mac 6 on DS is where it's at...



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- 1 Mini-PCI slot
- VIA Vinyl 6 Channel Audio
- 6 USB 2.0 ports
- VIA 10/100 LAN
- VIA ITV Out (HDTV)
- LVDS/DVI (optional)
- **Nano-ITX (120mm x 120mm)**
- Digital Media and Mobile Entertainment



Model: EPIA-N

- All in One
- VIA C7™/Eden™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 6 USB 2.0 ports
- 2 COM ports
- GLAN Controller
- TV Out (HDTV)
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media, Entertainment, Set Top Box



Model: EPIA - EN

Powerful and Flexible Digital Media

- All in One
- VIA C7™ Processor onboard with Integrated UniChrome™ Pro AGP graphics w/MPEG-2 acceleration
- DDRII 400/533
- 1 PCI slot
- Vinyl 6 channel Audio
- 8 USB 2.0 ports
- 1 COM port
- 10/100M LAN
- TV Out
- **Mini-ITX (170mm x 170mm)**
- KIOSK, Thin Client



Model: EPIA - CN

- All in One
- VIA C3™/Eden™ Processor onboard with Integrated Unichrome AGP graphics w/MPEG-2 Acceleration
- DDR 266
- Car/Bus/Compact Flash Support
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- 2 COM ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Wireless Media,Kiosk,Set Top Box



Model: EPIA - MII

Hard Working Small&Quiet Systems

- All in One
- VIA Luke CoreFusion Processor with Integrated UniChrome Pro AGP Graphics with MPEG-2/MPEG-4 Acceleration
- DDR 400 DIMM
- 1 PCI slot
- 2 SATA ports
- VIA Vinyl 6 Channel Audio
- 8 USB2.0
- 4 COM ports
- 2 VIA 10/100 Ethernet (1 optional Gigabit)
- 1 Digital I/O 4GPI/4GPO
- LVDS/DVI (optional)
- **Mini-ITX Form Factor (170mmx170mm)**
- Always-on Point of Sales Applications



Model: EPIA - EK

Digital Media and Entertainment

- All in One
- VIA C3™/Eden™ with Processor onboard Integrated Unichrome AGP graphics w/MPEG-2 Acceleraton
- DDR 266
- 1 PCI slot, 1 Floppy Connector
- Vinyl 6 channel Audio
- IEEE 1394 Firewire
- 4 USB 2.0 ports
- VIA 10/100 LAN
- TV Out
- LVDS/DVI (optional)
- **Mini-ITX (170mm x 170mm)**
- Digital Media and Entertainment



Model: EPIA - M

19" Mini-ITX Rackmount

Model No.:7677

- 19" 1U Rackmount
- Internal 3.5"HDD x 1
- PCI Expansion Slot x 2
- Slim Type CD / DVD x 1
- 45(H) x 484(W) x 400(D)
- Cooling: 2 x 40mm fans
- Power and HDD indicators
- **Mini-ITX(170mm x 170mm)**
- Power on/off



Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Millitary Application

Model No.: C1B

- 19" 1U Rackmount
- Internal 3.5" HDD x 1
- Internal 2.5" HDD x 1
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- **19"(W) x 13"(D) x 1.75"(H)**
- **Mini-ITX(170mm x 170mm)**
- Cooling: 2 x 40x28mm fans
- Power on/off and system reset
- Power, LAN and HDD indicators



Firewall/VPN/Telephony/Telecom/VoIP Network/Security/Millitary Application

Model No.: C1E

- 19" 1U Rackmount
- Internal 3.5" HDD x 2
- PCI Expansion Slot x 1
- Slim CD-rom/DVD-rom x 1
- 19"(W) x 14.5"(D) x 1.75"(H)
- Front access USB & LAN ports
- Power LAN and HDD indicators
- **Up to 12" x 9.6" ATX size mobo**
- Power on/off and system reset
- Cooling: 1 x 97mm blower or 2 x 40x56mm fans



World's Smallest Case

Model No.: 1677

- Color: Black
- Front Port: USB x 2
- Internal 2.5 HDD x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Nano-ITX (120mm x 120mm)**
- Power on/off and system reset
- **82.6mm(H) x 160mm(W) x 163mm(D)**



Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2677

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **63.5mm(H) x 295mm(W) x 272mm(D)**



Home Media Center, Set Top Box, Kiosk, Wireless Media

Model No.: 2600

- Color: Black
- Expansion Slot x 1
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- Slim Type CD / DVD x 1
- **63.5(H) x 295(W) x 272(D)**
- **Mini ITX (170mm x170mm)**
- 60W/80W Power Adaptor
- Power on/off and System Reset
- USB x 2, Audio x 1, Mic x 1, 1394 x 1, IR Module (Optional)



Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3677

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 275mm(D)**



Set Top Box, Thin Client, Car Entertainment, Smart Mini PC

Model No.: 3688

- Front Port: USB x 2
- Internal 2.5" HDD x 1
- 6cm Cooling Fan x 1
- Slim Type CD / DVD x 1
- 60W/80W Power Adaptor
- **Mini ITX (170mm x170mm)**
- Power on/off and system reset
- **65mm(H) x 210mm(W) x 258mm(D)**



Stylish Cube Entertainment centers

Model No.: 669

- Expansion Slot x 2
- Internal 3.5" HDD x 1
- 4cm Cooling Fan x 2
- External 3.5" HDD x 1
- External 5.25" HDD x 2
- 200W ATX Power Supply
- **Mini-ITX (170mm x 170mm)**
- USB2.0 x 2, 1394/Audio/Mic x 1
- **200mm(H) x 225mm(W) x 330mm(D)**

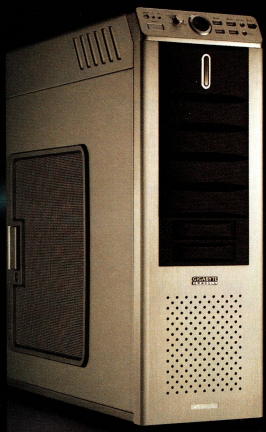


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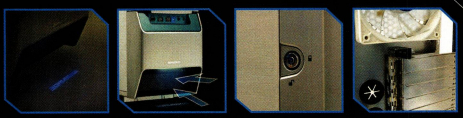
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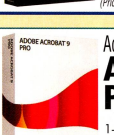
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Panasonic Thermal Film

Model	Genuine	TONNY
KX-FA54E	$ 49.00	$ 18.00
KX-FA55A	$ 49.00	$ 19.00
KX-FA57E	$ 57.00	$ 15.00
KX-FA134	$ 82.00	$ 35.00
KX-FA135	$ 58.00	-
KX-FA136	$ 63.00	$ 26.00
KX-FA137	$ 75.00	-

Ricoh Laser Toner

Model	Genuine	TONNY
Type 30	$ 131.00	$ 59.00
Type 70	$ 140.00	$ 78.00
Type 150	$ 140.00	$ 74.00
Type 1435	$ 158.00	$ 83.00

Sharp Thermal Fax Rolls

Model	Genuine	TONNY
FO-3CR	$ 31.00	$ 16.00
FO-6CR	$ 24.00	$ 18.00
FO-3CR	$ 30.00	$ 18.00
FO-15CR	$ 44.00	$ 21.00

Lexmark Toner Cartridges

Model	Genuine	TONNY
Optra E/E+	$ 105.00	$ 61.00
E120	$ 94.00	$ 62.00
E210	$ 123.00	$ 59.00
X215	$ 90.00	$ 49.00
E220	$ 142.00	$ 79.00
E230/232/330/332	$ 97.00	$ 67.00

Model	Genuine	TONNY
E240	$ 94.00	$ 67.00
E250	$ 128.00	$ 74.00
E310/312	$ 133.00	$ 73.00
E320/322	$ 131.00	$ 82.00
E321/323 3k	$ 118.00	$ 85.00

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*Of equal value or less

Epson Ink Cartridges

Model	Genuine	TONNY
T028	$ 41.00	$ 5.00
T029	$ 37.00	$ 7.50
T038	$ 20.00	$ 5.00
T039	$ 27.00	$ 7.50
T0461	$ 22.00	$ 4.50
T0472/3/4	$ 16.00	$ 4.50
T0491/2/3	$ 21.00	$ 4.50
T0494/5/6	$ 21.00	$ 4.50
T0621	$ 22.00	$ 6.80
T0631	$ 17.00	$ 6.80
T0632/3/4	$ 16.00	$ 6.80
T0731	$ 17.00	$ 7.40
T0732/3/4	$ 17.00	$ 4.50
T0811/2/3	$ 27.00	$ 8.40
T0814/5/6	$ 27.00	$ 8.40
S020089 / T052	$ 34.00	$ 5.30
S020093/ T050	$ 28.00	$ 5.30
S020108/ T051	$ 32.00	$ 5.30
S020110 / T053	$ 25.00	$ 6.10
S020187/T050	$ 28.00	$ 5.30
S020189/ T051	$ 32.00	$ 5.30
S020191 / T052	$ 34.00	$ 5.30
S020193 /T053	$ 25.00	$ 6.10
T0540	$ 14.00	$ 6.80
T0541/2/3/4/7/8/9	$ 21.00	$ 6.80
T557	$ 36.00	$ 20.50
T0561/2/3/4	$ 17.00	$ 6.80
T0751/2/3/4	$ 14.00	$ 6.80
T0591/2/3/4	$ 24.00	$ 8.40

Lexmark Ink Cartridges

Model	Genuine	TONNY
18C0781A (#1)	$ 28.00	-
13400HC	$ 43.00	$ 18.00
13619HC	$ 43.00	$ 28.00
10N0016 (#16)	$ 36.00	$ 24.00
15M0120 (#20)	$ 44.00	$ 24.00
10N0026 (#26)	$ 39.00	$ 23.00
18C0031 (#31)	$ 36.00	$ 25.00
18C0032 (#32)	$ 26.00	$ 20.00
18C0033 (#33)	$ 31.00	$ 22.00
18C0034 (#34)	$ 31.00	$ 25.00
18C0035 (#35)	$ 36.00	$ 27.00
12A1970 (#70)	$ 38.00	$ 21.00
12A1980 (#80)	$ 45.00	$ 22.50
18L0032 (#82)	$ 36.00	$ 25.00
18L0042 (#83)	$ 43.00	$ 23.00

Brother Ink Cartridges



Model	Genuine	TONNY
LC-37BK	$ 23.00	$ 5.00
LC-37C/M/Y	$ 37.00	$ 6.50
LC-47BK	$ 30.00	$ 5.00
LC-47C/M/Y	$ 19.00	$ 6.50
LC-57BK	$ 30.00	$ 5.00
LC-57C/M/Y	$ 19.00	$ 6.50
LC-800BK	$ 30.00	$ 5.00
LC-800C/M/Y	$ 19.00	$ 6.50

HP Toner Cartridges

Model	Genuine	TONNY
Q2612A	$ 90.00	$ 45.00
Q2613A	$ 92.00	$ 49.00
Q2613X	$ 110.00	$ 55.00
C7115A	$ 81.00	$ 45.00
C7115X	$ 97.00	$ 49.00
Q7516A	$ 215.00	$ 110.00
Q5949A	$ 92.00	$ 49.00
Q5949X	$ 155.00	$ 55.00
Q7551A	$ 154.00	$ 71.00
Q7551X	$ 253.00	$ 76.00
Q7553A	$ 102.00	$ 61.00
Q7553X	$ 175.00	$ 66.00
CB435A	$ 82.00	$ 61.00
CB436A	$ 92.00	$ 65.00
C8061X	$ 152.00	$ 65.00
C4092A	$ 79.00	$ 45.00
C4096A	$ 123.00	$ 59.00
92298A	$ 129.00	$ 59.00
Q3960A/C9700A	$ 104.00	$ 76.00
Q3961A/C9701A	$ 122.00	$ 76.00
Q3962A/C9702A	$ 122.00	$ 76.00
Q3963A/C9703A	$ 122.00	$ 76.00
Q6000A	$ 97.00	$ 84.00
Q6001/2/3A	$ 104.00	$ 86.00
Q7560A	$ 159.00	$ 113.00
Q7561/2/3A	$ 154.00	$ 113.00

Brother Toner Cartridges

Model	Genuine	TONNY
TN-2025	$ 74.00	$ 49.00
DR-2025	$ 123.00	$ 65.00
TN-2150	$ 79.00	$ 51.00
TN-3185	$ 105.00	$ 59.00
DR-3115	$ 187.00	$ 73.00
TN-7600	$ 99.00	$ 59.00
DR-7000	$ 172.00	$ 73.00
TN-8000	$ 48.00	$ 23.00
DR-8000	$ 199.00	$ 83.00
TN-04BK	$ 195.00	$ 99.00
TN-04C/C/Y	$ 195.00	$ 99.00

Canon Toner Cartridges

Model	Genuine	TONNY
CART 303	$ 89.00	$ 45.00
CART 308	$ 89.00	$ 49.00
CART 308 II	$ 158.00	$ 55.00
CART 309	$ 239.00	$112.00
CART 310	$ 143.00	$ 59.00
EP-22	$ 75.00	$ 45.00
EP-25	$ 82.00	$ 45.00
FX-9	$ 115.00	$ 49.00
CARTN	$ 216.00	$ 59.00
CARTU	$ 105.00	$ 45.00
CARTW	$ 141.00	$ 45.00
E-31	$ 159.00	$ 55.00

Toner powder also available for HP & Samsung

from $14.90

Canon Ink Cartridges

Model	Genuine	TONNY
BC-02	$ 39.00	$ 21.00
BC-03	$ 35.00	$ 22.00
BX-3	$ 40.00	$ 22.00
BX-20	$ 49.00	$ 20.00
BC-05	$ 47.00	$ 25.00
BC-20	$ 47.00	$ 22.00
PG-40	$ 34.00	$ 24.00
CL-41	$ 35.00	$ 24.50
PG-50	$ 42.00	$ 27.00
CL-51	$ 45.00	$ 32.00
CL-52	$ 38.00	-
BCI-3eBK	$ 19.00	$ 6.40
BCI-3eC/M/Y	$ 17.00	$ 5.70
BCI-6BK	$ 22.00	$ 5.70
BCI-6C/M/Y	$ 22.00	$ 5.70
BCI-6PC/PM	$ 22.00	$ 5.70
BCI-6G/R	$ 22.00	$ 5.70
CLI-8BK with chip	$ 22.50	$ 9.80
CLI-8C/M/Y with chip	$ 22.50	$ 9.80
CLI-8PC/PM with chip	$ 22.50	-
CLI-8G/R with chip	$ 22.50	-
PGI-5BK with chip	$ 22.50	$ 9.80
CLI-8BK no chip	-	$ 5.70
CLI-8C/M/Y no chip	-	$ 5.70
CLI-8PC/PM no chip	-	$ 5.70
PGI-5BK no chip	-	$ 5.70
BCI-15BK	$ 24.00	$ 6.10
BCI-15C	$ 39.00	$ 6.30
BCI-16C	$ 39.50	$ 6.30
BCI-24BK	$ 14.00	$ 5.60
BCI-24C	$ 31.00	$ 6.90



Rated 9 out of 10 by PC User

HP Ink Cartridges

Model	Genuine	TONNY
C8721WA (#02BK)	$ 26.00	$ 11.00
C8771/2/3/4/6WA (#02C/M/Y/LC/LM)	$ 16.00	$ 10.00
C4844A (#10BK)	$ 42.00	$ 14.00
C4841/2/3AA(#10C/M/Y)	$ 42.00	$ 14.00
C4836/7/8AA(#11C/M/Y)	$ 42.00	$ 14.00
C5011D (#14 BK)	$ 33.00	$ 16.00
C5010D (#14 C)	$ 42.00	$ 16.00
C6615DA(#15)	$ 37.00	$ 22.00
C9351AA (#21)	$ 23.00	$ 16.00
C9352AA (#22)	$ 25.00	$ 21.00
CC630AA (#21 & #22 Combo)	$ 37.00	-
C8727AA(#27)	$ 26.00	$ 16.00
C8728AA (#28)	$ 30.00	$ 22.00
Y2016AA (#27 &#28 Combo)	$ 42.00	-
51645AA (#45)	$ 39.00	$ 16.00
Y2017AA (#56 & #57 Combo)	$ 56.00	-
C6656AA (#56)	$ 28.00	$ 17.00
C6657AA (#57)	$ 43.00	$ 23.00
C6658AA (#58)	$ 33.00	$ 23.00
CB336WA(#74XL)	$ 40.00	$ 28.00
CB338WA (#75XL)	$ 43.00	$ 30.00
C8765WA(#94)	$ 28.00	$ 18.00
C8766WA(#95)	$ 33.00	$ 20.00
C8767WA (#96)	$ 40.00	$ 20.00
C9366WA(#97)	$ 43.00	$ 18.00
C9364WA (#98)	$ 25.00	$ 20.00

Samsung Laser Toner

Model	Genuine	TONNY
SCX-4100D3	$ 101.00	$ 49.00
SCX-4216D3	$ 106.00	$ 49.00
SCX-D4200A	$ 106.00	$ 49.00
SCX-4521D3	$ 106.00	$ 49.00
SCX-D4725A	$ 106.00	$ 64.00
SCX-5312D6	$ 97.00	$ 70.00
SF-5100D3	$ 95.00	$ 49.00
ML-1210D3	$ 101.00	$ 49.00
ML-1610D2	$ 101.00	$ 49.00
ML-D1630A	$ 101.00	$ 74.00
ML-1650D8	$ 188.00	$ 92.00
MLT-D108S	$ 80.00	-
ML-D3050B	$ 226.00	$ 86.00
ML-1710D3	$ 141.00	$ 49.00
ML-2010D3	$ 101.00	$ 49.00
ML-2150D8	$ 188.00	$ 89.00
ML-2250D5	$ 125.00	$ 68.00
CLP-300A BK	$ 89.00	$ 41.00
CLP-300A C/M/Y	$ 79.00	$ 39.00
CLP-500/550D7 BK	$ 145.00	$ 98.00
CLP-500/550D5 C/M/Y	$ 156.00	$101.00
CLP-510D7 BK	$ 141.00	$101.00
CLP-510D5 C/M/Y	$ 156.00	$101.00
CLP-600A BK	$ 121.00	$113.00
CLP-600A C/M/Y	$ 169.00	$117.00

Konica Minolta Color Laser Toner

Model	Genuine	TONNY
QMS Magicolor 2200/2210 BK	$ 147.00	$ 107.00
QMS Magicolor 2200/2210 C/M/Y	$ 269.00	$ 130.00
QMS Magicolor 2300/2350 BK	$ 129.00	$ 69.00
QMS Magicolor 2300/2350 C/M/Y	$ 192.00	$ 69.00

Model	Genuine	TONNY
QMS Magicolor 2400W/2430DL/2450 BK	$ 130.00	$ 85.00
QMS Magicolor 2400W/2430DL/2450 C/M/Y	$ 193.00	$ 85.00
QMS Magicolor 3300 BK	$ 89.00	$ 86.00
QMS Magicolor 3300 C/M/Y	$ 251.00	$ 119.00

For purchase under $50 on TONNY Cartridges a standard freight charge of $6.50 applies for all areas within Australia.

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LINE CONNECT model

CRU2 is designed to connect direct to ANY telephone line extension, to provide High Quality telephone call recording to your PC (PC software provided) or other recording device. Provides automatic operation with start/stop capability from any telephone.



HANDSET CONNECT model

CRU3 is designed to connect to any PABX, COMMANDER, PSTN or VOIP handset. Will then provide High Quality telephone call recording to your PC (PC software provided). Automatic operation with start/stop activation from your PC.



PROFESSIONAL model

CRU4 provides all facilities of the CRU3 Model (it connects to any handset) and in addition allows message(s), or previous recordings to be played back to the other party at any time. Allows notes to be tagged to the recording tile.



AUTO DIGITAL ANNOUNCEME

Our AUTOMATIC ANNOUNCEMENT DEVIC Answer your incoming telephone calls, p announcement and then resume ringing of your telephones. Ideal for announcing change of number or that the call will be recorded.



TELEPHONE LINE DOOR STATION SOLUTIO

DOOR STATION UNIT

DS2 will RING all of your telephones when a visitor arrives at your front door or gate. Answer to communicate. Open the door or gate with touch tones. Or ordinary single line or multi-line phone set. Or surface mount or flush mount door phone.



PABX DOOR STATION UNIT

DS4 is designed to be connected to an analogue extension of any PABX, Commander or other multi-line telephone system. DS4 goes "off-hook" when activated by the door phone. Requires surface mount or flush mount door phone.



DOOR STATION DIAL OUT

Our New DS6 model will RING your telephones and then DIAL OUT to a pre-programmed telephone number if a visitor arrives and you are not home. Requires Surface Mount or Flush Mount Door Phone. Can also connect to a PABX extension.



DOOR PHONES



A range of door phones are available

SHARE YOUR LINES AND SAVE INSTALLATION & RENTAL CHARGES

FAXSTREAM DUET SWITCHES

Will allow your Fax or Modem device to operate with the Telstra FaxStream Duet service.

Provides fully automatic fax reception, just like having a separate line. Two models are available.



INTELLIGENT FAXSWITCH

FAX SWITCH will allow your existing Fax Device to connect to a Single Telephone line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Fax operation. Will operate with all existing telephones and also an Answering machine.



INTELLIGENT MODEMSWITCH

MODEM SWITCH allows your existing Data Modem Device to connect to any Single Telephone Line, Fax Line or a Multi Line (PABX) phone system, to provide for FULLY AUTOMATIC Dial In & Dial Out Modem Data operation. Models available that allow up to 8 devices on 1 line.



EFTPOS SWITCH

EFTPOS switch will allow your existing EFTPOS device any existing Single Telephone Line, Fax Line or a Multi Line (PABX) phone system. Provides automatic connection on dialing. BARGE-IN protection prevents interference when line is in use. Alternative model will allow operation on 2 lines.



MISCELLANEOUS TELEPHONE LINE APPLICATIO

VOIP SELECTOR

This device will allow you to connect one or more telephones to your TELEPHONE LINE and VOIP LINE. Incoming calls from either line ring on the connected telephone(s). Outgoing calls are automatically DEFAULTED to ONE LINE but the alternative line can be selected by DTMF code.



TWO LINE SELECTOR

Premium device will allow you to connect one Telephone Device to two Telephone lines (Telstra, Optus, VOIP, PABX etc). Ideal for EFTPOS, Cordless Phones, Modems etc. Additional features are provided including automatic (or manual) selection of an alternative line if the default line is busy.



TELEPHONE CALL TRANSFER

Easy-Transfer will allow you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.



MULTIPLE NUMBER SWITCH

Operate Two numbers on one line. This device will Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.



TELEPHONE LINE ON HOLD SOLUTIONS

DIGITAL ON HOLD

DMC Australia's Leading On Hold player is an MP3 based Message On Hold Device, designed to provide the High Quality and High Reliability that is necessary for all telephone On Hold applications. Easy message change provided by replacing memory card.



ELECTRONIC MESSAGE UPDATE

DMS is available with range of optional Automatic electronic message update methods including Email, Modem, FTP and Network IP. We have a National Network of Dealers ready to produce your customized message.



SINGLE LINE ON HOLD

Just plug our MOH Line Sharer into any socket on your singe telephone line, connect any audio source (Radio, PC or DMC) and you now have a professional telephone line On Hold facility for your existing telephones.



AUTOMATIC CALL ATTENDANT

Our single line CALL ATTENDANT will answ incoming calls after a preset number of rin a greeting & then put your call on hold until you are able to answer. Also provides Message on Hold facility for your single line.



MORE MISCELLANEOUS EQUIPME

TELEPHONE LINE SIMULATOR

This TELEPHONE LINE SIMULATOR can be used for testing, programming & demonstration of analogue telecommunications equipment, without the need to use a telephone line and generating costly calls. 4 Models are available.



RING INDICATOR

This device detects incoming calls and will close/open a relay to match the cadence of the incoming ring. Can also be set to close a relay until a call is answered. Ideal for control of external horns or lights to advise of an incoming telephone call.



REMOTE TELEPHONE ACTIVATOR

Call in to Switch ON Switch OFF or RESET your PC, SERVER or any electrical device by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU accessory. 3 models are available.



POWER CONTROL UNIT

PCU connects direct to the RTA and also to your socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug in User Installation. Controls up to 10 Amps.



DIGITAL AUDIO EQUIPMENT

MESSAGE ON DEMAND

TDS can be programmed with up to 256 MP3 based messages stored on an MMC/SD card, which can be recalled and played by keypad entry or time programmed sequences.



BACKGROUND MUSIC SYSTEM

High Quality BMS holds up to 8GB of MP3 Music/Messages on a SD Flash Card. Plays Messages at user set intervals. Powerful internal amp will allow direct connection of up to 8 speakers. Line Level output is also provided. Has encryption facility.



TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon it is triggered by a movement sensor, a switch, or a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



MULTIPLE INPUT UNIT

MIU will allow for up to 12 separate movement sen switches to be connected to the TDU. Each sensor its own unique message output via any 8 ohm unpowered, powered or amplified speaker.



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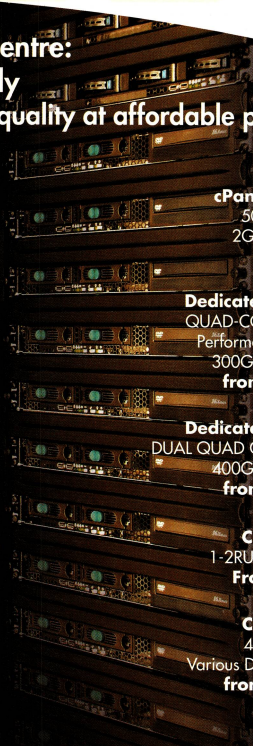
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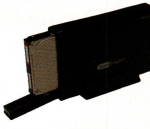
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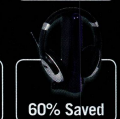
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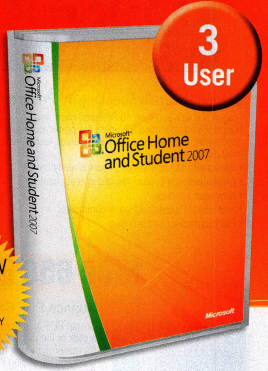
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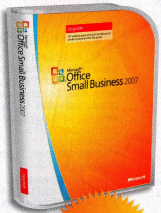
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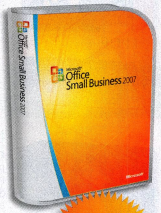
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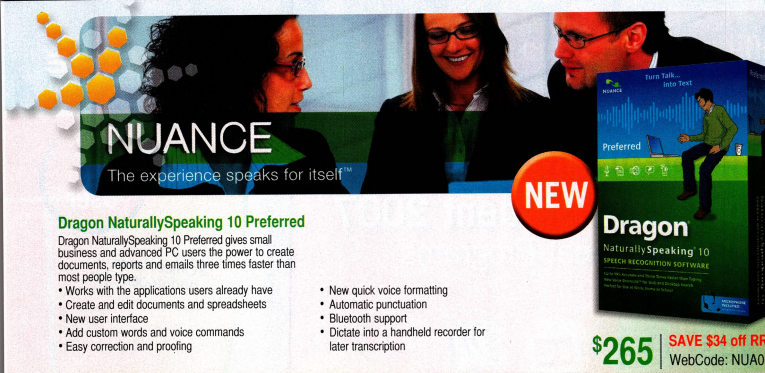
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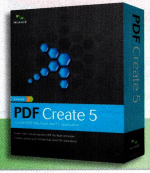
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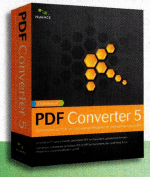
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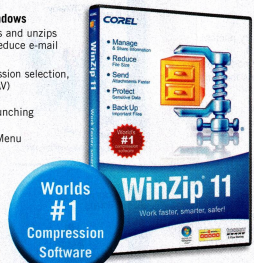
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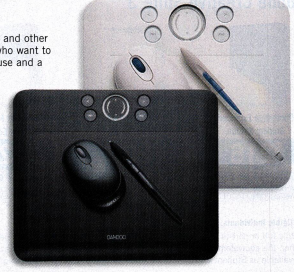
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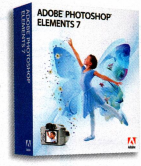


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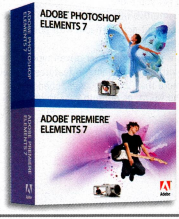
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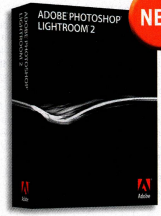
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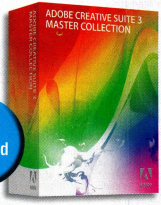
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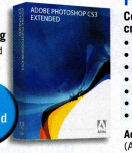
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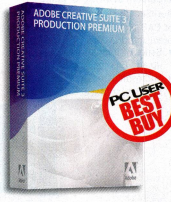
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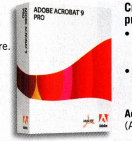


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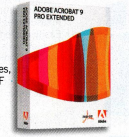
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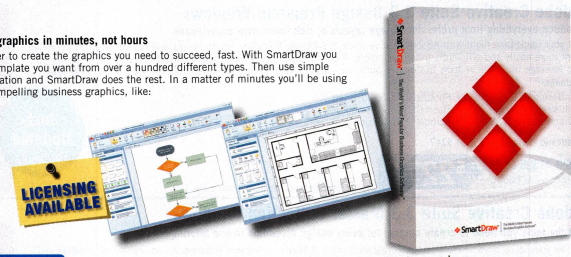
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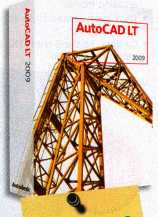
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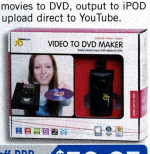


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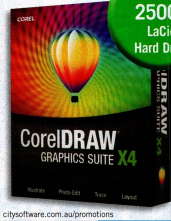
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- Back up data
- Play DVDs and AVCHD discs.

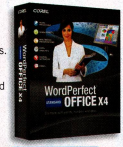


SAVE $15 off RRP
WebCode: COR9996
$114

orel WordPerfect Office X4 tandard Edition - Upgrade

ur one stop office suite

e essential office suite for home and business ers to create documents, spreadsheets, esentations, and manage e-mail. Open, edit and save Microsoft Office documents. Save hundreds with the built-in PDF tools. Includes a digital notebook, data analysis software and free online service.



SAVE $127 off RRP
ebCode: COR8986
$202

Roxio Easy Media Creator 10

Ignite your digital life

- Convert audio and video files to the format of your choice
- Make your digital memories stand out with powerful editing
- Burn fast and copy with one click - even on the latest Blu-ray and HD DVD discs
- Show of your latest vacation pics and clips on iPod, PSP and mobile phone



BONUS Sandisk 1GB USB Drive

SAVE $53 off RRP
WebCode: ROX5002
$126

Nero 8

Copy discs with just one click

- Direct access to all features from the project launcher
- High Definition format support
- Xbox 360 and PlayStation 3 streaming features
- Blu-ray Disc and HD DVD burning support
- Graphics optimised for Windows Vista

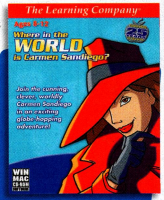


SAVE $71 off RRP
WebCode: NERO028
$128

Where in the world is Carmen Sandiego?

Travel the globe uncovering clues

The infamous Carmen Sandiego is at it again and this time she's made off with a rare and valuable edition of the "Travels of Marco Polo," as well as many other stolen items. To recover these valuable treasures and catch this cunning (or clever) mastermind, the Chief needs the best detective in the agency—YOU! Travel the globe uncovering clues and match wits with the elusive Carmen Sandiego as you recover the stolen treasures of knowledge!



$29.95 WebCode: IMS0058

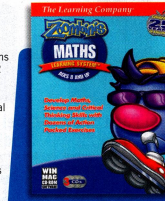
Zoombinis Maths Learning System

Journey into 3 mind-bending puzzle packed epic maths adventures!

Zoombinis Logical Journey CD: Develop maths and logic skills on your expedition across 12 perilous puzzles with 4 levels of challenge

Zoombinis Mountain Rescue CD: Develop foundational and advanced maths and logical skills while exploring 9 menacing puzzles with 3 levels of difficulty.

Zoombinis Island Odyssey CD: Develop maths, logic and scientific-thinking skills on a courageous expedition exploring 7 perilous puzzles with 3 levels of challenge



$29.95 WebCode: IMS0077











$19.95





























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Rated family history software

namically maps ALL the places your cestors lived in
er 700 industry standard templates urceWriter helps you prepare properly matted sources
ilt-in report generator prints over 0 charts and reports
erview Reports – over 1,200 carefully ewritten questions
arches the best genealogy sites in stralia, New Zealand and the world unning full-colour wall charts even IA charts!
eate and view historical timelines rld-wide



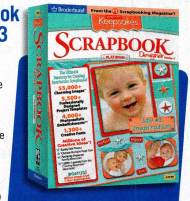
$69 SAVE $10 off RRP
WebCode: IMS0078

Keepsakes Scrapbook Designer Platinum 3

Scrapbooking made easy!

Get all of the tools you need to design and print your own unique scrapbook pages.

- Personalise one of 5,500 professionally designed Project Templates with images from the art gallery or your own photos and creativity
- Add embellishments for birthdays, holidays, weddings, hobbies and more with 55,000 top-quality images.
- Have fun or get creative with 1,200 imaginative fonts and 50 Journalette shapes to choose from.



$59 SAVE $10 off RRP
WebCode: IMS0079

$69.95
WinJournal 1.0
For journals, blogs & podcasting
WebCode: MAR0100

$59.95
Visual Thesaurus
3D interactive thesaurus
WebCode: THI0100

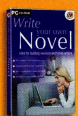
$49.95
TuneRanger
Keep & Copy iTunes - Networkable
WebCode: SMI0001

$59.95
Pumped For Life Level 1
Personal Trainer on your iPod
WebCode: PUM0100

$19.95



WebCode: GSP0006



WebCode: GSP0016



WebCode: GSP0005



WebCode: GSP0003



WebCode: GSP0001



WebCode: GSP0013



WebCode: GSP0014



WebCode: GSP0012



WebCode: GSP0008



WebCode: GSP0010



WebCode: GSP0009



WebCode: GSP0011



WebCode:GSP0007



WebCode: GSP0015

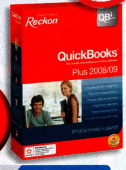
QuickBooks Plus 2008/09

Track Inventory & payroll

Time saving features and functionality for any efficient minded business.

- Integrated payroll
- Produce business reports
- Inventory management
- Track GST & Lodge BAS online
- Process credit card payments
- Import bank statements
- Manage sales and customers
- 12 Months FREE technical support and upgrades

PC USER BEST BUY



BONUS $100 Caltex StarCash Fuel Card

SAVE $81 off RRP
WebCode: QUI0152
$498

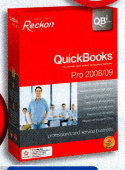
QuickBooks Pro 2008/09

Integrate seamlessly with Microsoft Office

Prepare quotes & estimates, and analyse key projects using the included advanced tools.

- Time billing & job costing
- Integrate with Microsoft Office
- Design custom forms
- Integrated payroll
- Produce business reports
- Inventory management
- Track GST & Lodge BAS online
- Process credit card payments
- Import bank statements
- Manage sales and customers
- 12 Months FREE technical support and upgrades

PC USER BEST BUY



BONUS $150 Caltex StarCash Fuel Card

SAVE $118 off RRP
WebCode: QUI0153
$731

QuickBooks Premier 2008/09

3 User access

Designed to meet specific industry need, mul user capability to help increase your business efficiency.

- Multi-user access
- Time billing & job costing
- Integrate with Microsoft Office
- Design custom forms
- Integrated payroll
- Produce business reports
- Inventory management
- Track GST & Lodge BAS online
- Process credit card payments
- 12 Months FREE technical support and upgrades

PC USER BEST BUY



BONUS $200 Caltex StarCash Fuel Card

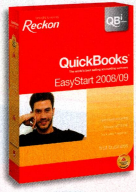
SAVE $201 off RRP
WebCode: QUI0154
$1198

QuickBooks EasyStart 2008/09

Designed for first time users

Simple and practical tools make it easy to manage all essential business tasks.

- Easy to learn and use
- Cash based accounting
- Manage GST & BAS
- Track sales & expenses
- Invoice & pay bills



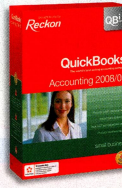
SAVE $16 off RRP
WebCode: QUI0150
$123

QuickBooks Accounting 2008/09

Designed for small businesses

Powerful accounting solution specifically designed for small businesses that don't require payroll.

- Inventory management
- Track GST & Lodge BAS online
- Process credit card payments
- Import bank statements
- Manage sales and customers
- 12 Months FREE technical support and upgrades



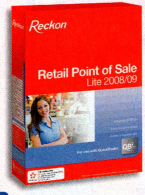
SAVE $42 off RRP
WebCode: QUI0151
$257

Reckon Retail Point of Sale Lite 2008/09

Point of Sale made easy

Designed for startup retailers requiring simple point of sale software, including all the features you need to track all of your sales, inventory, purchase orders, customers and accounting.

- Stock management
- Manage laybys
- Label & print software included
- Seamless integration with Quickbooks QB' series



SAVE $41 off RRP
WebCode: QUI0161
$248

Reckon Retail Starter Kit 2008/09

The all-in-one POS & Accounting Solution

If you are opening your store for the first time, or upgrading from a cash register,then Reckon's **Retail Starter Kit** is what you need.

- QuickBooks Plus 2008/09 QB' Series
- Retail Point of Sale Lite 2008/09
- Thermal Printer, Scanner & Cash Drawer
- 12 months free technical phone support Upgrades



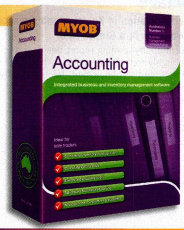
SAVE $151 off RRP
WebCode: QUI0162
$848

MYOB Accounting 18

With MYOB Accounting's inventory management system you'll know what's in stock, what's on order and what's committed. The inventory management system is integrated with the sales and purchasing features, so your stock listing is always up to date and accurate.

MYOB Accounting helps save you time and money by providing instant access to detailed lists of unpaid customer invoices, bank balances and transactions using the Bank Register, customisable invoices for printing on plain paper, customer trading history, complete stock audit trails and low stock level alerts...and much more.

Upgrade (MYB0093) **$228**

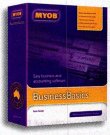


$282 | SAVE $67 off RRP
WebCode: MYB0086

MYOB BusinessBasics

Manage all your basic business tasks from the one easy program, designed specifically for small or home-based Australian businesses. Streamline the data entry and reconciliation side of managing your business with MYOB Business Basics, and free up your time to focus on running it. MYOB Business Basics is ideal if you:

- Run a small or home based business
- Employ no staff
- Have no inventory



$128 | SAVE $21 off RRP
WebCode: MYB0004

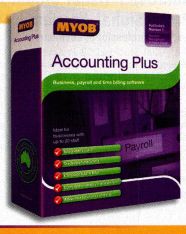
MYOB Accounting Plus 18

With an award-winning integrated payroll, MYOB Accounting Plus is the ideal single-user business management and accounting solution for small employers. MYOB Accounting Plus makes it easy to track and charge for your time and manage your inventory, and provides easy access to powerful profit-building information about your business.

It also:

- Automates your Pay Runs
- Calculates PAYG withholdings
- Works out your superannuation and then updates all your accounts automatically

Upgrade (MYB0094) **$317**



$478 | SAVE $117 off RRP
WebCode: MYB0087

MYOB RetailReady

MYOB RetailReady contains all the software and hardware you need to turn your PC into an effective Point of Sale (POS) solution. RetailReady processes sales fast, reports GST and performs "Cash Ups" in just a few clicks.

Includes:

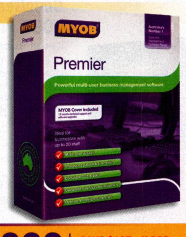
- MYOB Retail Basics
- Barcode Scanner
- Thermal Docket Printer
- Electronic Cash Drawer



$872 | SAVE $127 off RRP
WebCode: MYB0040

MYOB Premier 12

MYOB Premier gives you the power to manage even the most complex medium-sized business. Get the complete set of business management features as found in MYOB Accounting Plus and also handle transactions and accounts in multiple currencies. Multiple people can access your business information at the same time, which can help make your processing more efficient. For example, someone can enter a sale while someone else prints a report or enters a cheque - think of the time you'll save! MYOB Premier is also issued with one full year of access to software support and upgrades.



$1328 | SAVE $167 off RRP
WebCode: MYB0089

MYOB RetailManager v10

Our retail software is designed, developed and tested in close collaboration with existing retail businesses. By automating many of your key store procedures and processes.

- Process sales fast, including lay-bys and accounts
- Manage your inventory
- Identify where you're making money
- Comprehensively manage pricing

BONUS
Hand Scanner
Limited Stock



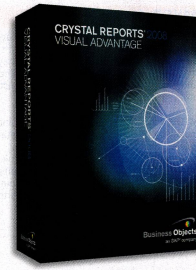
$1488 | SAVE $502 off RRP
WebCode: MYB0085

Crystal Reports 2008 Visual Advantage

New crystal reports visual advantage combines the visualisation of Xcelsius and the reporting reliance of Crystal Reports 2008. The Best of Both Worlds – At a Great Price!

Get a clearer view of your business performance with our industry-leading report designer and visualization combined solution. You'll be able to create highly formatted reports with what-if scenario models, interactive dashboards and charts and deliver them via the web, email, Microsoft Office, Adobe PDF, or embedded in enterprise applications

- Drive performance with industry-leading report and visualization solution
- Users can make better decisions with on-report what-if analysis
- Maximize your reporting power from day one with "what-if" analysis
- Minimise IT and developer effort with interactive reports
- Present your data like never before with stunning report visualisations
- Save design time by embedding Xcelsius models in reports without coding
- Empower your users to make better operational and strategic decisions



SAVE $60 off RRP
WebCode: SLL1615
$1339

Microsoft Project Standard 2007

A project manager's dream

Microsoft Office Project Standard 2007 gives you robust project management tools with the right blend of usability, power, and flexibility, so you can manage projects more efficiently and effectively.



Academic
(MSA6141) **$99**
Upgrade
(MSA6143) **$536**

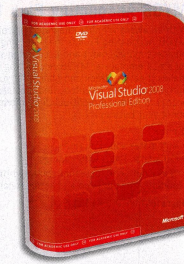
SAVE $141 off RRP
WebCode: MSA6142
$892

MICROSOFT PRICE CHECKER
Harris Technology $919
JB Hi-Fi $1096

Microsoft Visual Studio 2008 Professional Academic

Ideal for professional developers

The Visual Studio 2008 Professional Edition enables developers and development teams to create great connected applications on the latest platforms, including the Web, Windows Vista, the 2007 Office System, SQL Server 2008, and Windows Server 2008. Developers using Visual Studio 2008 Professional Edition can target the Microsoft Office system, Windows Mobile devices, and SQL Server.Visual Studio tools for Office is now a fully integrated part of Visual Studio 2008 Professional Edition.



Full (MSA9889) **$1250**
Upgrade (MSA9890) **$852**

SAVE $21 off RRP
WebCode: MSA9891
$164

CodeGear Delphi 2009 Professional

Professional Win 32 Development

Delphi 2009 is the development environment of choice for software developers and database application developers building high performance rich UI native Windows applications. Internationalise your applications with new Unicode support throughout the Delphi environment. Build powerful, efficient and secure database applications with Datasnap technology. Build AJAX enabled web apps with VCL for the Web. Language enhancements include generics and anonymous methods.

Also available in Enterprise and Architect versions



Upgrade (BOR0192) **$518**

SAVE $69 off RRP
WebCode: BOR0191
$1167

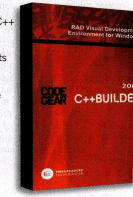
CodeGear C++Builder 2009 Professional

C++ at its best

C++Builder 2009 - the power of the C and C++ languages and libraries with the productivity of RAD development. Enjoy new feature enhancements and productivity improvements to maximize your application development.

Added C++0x language enhancements and libraries like TR1 and Boost. Internationalize your applications with new Unicode support throughout the C++ environment.

Create great user interfaces with new VCL components. Build AJAX enabled web apps.



Upgrade (BOR0194) **$518**

SAVE $69 off RRP
WebCode: BOR0193
$1167

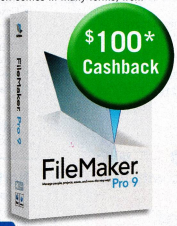
ileMaker ro 9 Upgrade

nally, an easy-to-use database software for Small Businesses!

ombining both power and simplicity, FileMaker Pro 9 gives you the ols you need to connect to the world of data! The award-winning ease use that is built into every aspect of FileMaker Pro continues to be aised by millions of customers and industry experts around the world. th its easy installation and setup, you'll be up and running in a matter minutes - not hours or days. Information comes in many forms, from siness cards to Microsoft Excel files, ages to SQL Server data - FileMaker o helps you bring it all together with few clicks. Convert Excel spreadsheets d other files to FileMaker Pro databases r easier searching, sorting, reporting, d sharing. Or use powerful productivity atures designed to make data entry uch faster and more accurate.

ll (FIL2000) **$477**
ademic (FIL2002) **$294**
ademic 5-pack (FIL2005) **$1182**
pack (FIL2003) **$1914**

grade 5-pack (FIL2004) **$1134**
s $400 Cashback*



SAVE $51 off RRP
WebCode: FIL20001

You Pay $288
$188
After $100 Cashback

*See citysoftware.com.au/promotions

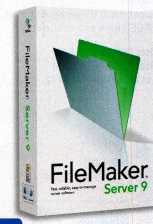
FileMaker Server 9 Upgrade

Share your database with ease

FileMaker Pro has outstanding peer-to-peer sharing built right in. So why add a server? There are three key reasons: expanded availability, enhanced security and increased performance.

Simply install FileMaker Server software on a dedicated computer and upload your FileMaker Pro databases to the server. You and your team will instantly realize how fast and easy it is to access your databases 24/7, schedule automated backups, and find information and much more! Whether you have a team of two or a department of hundreds, FileMaker Server makes it effortless to securely share your FileMaker Pro databases with Windows and Mac OS users on your network or over the Web.

Academic (FIL2011) **$977**
Full (FIL2009) **$1578**



SAVE $51 off RRP
WebCode: FIL2010

$939

ento by FileMaker

atabases made easy

eet Bento, the new personal database from FileMaker that's as easy use as your Mac. It organises all the details of your busy life in one ace. So you can manage contacts, coordinate events, track projects, d prioritize tasks faster and easier than ever before. It's never been easier get organized thanks to built -in links with Mac OS X.

***ubstance, meet style* -** It's never been easier to get organized thanks built-in links with Mac OS X Address Book and iCal, ready-to-use mplates, and elegant themes designed by Mac artists.

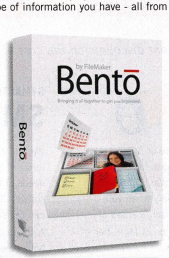
***ring it together* -** From contacts and calendars, to projects and events, u can organize just about every type of information you have - all from ne place, with this one program.

***e things your way* -** Just point and ick or drag and drop to change the ok of any form and see information a way that makes sense to you.

User (FIL2016) **$129**



Macworld Editors Choice Quote:
nto is a lightweight personal abase application that, at its e, is about making databases ssible and easy for the casual r. Bento's look, inspired by the es of iTunes an iPhoto, will be miliar to most Mac users.



WebCode: FIL2015

$79

FileMaker.

Licensing Program

FileMaker licensing options give you a choice of licensing and maintenance options designed around the way you work. Our goal is to provide you with the easiest software licensing options ever - no points, no complex contracts, just simple options that let you get the software you need at a price you can afford. For corporate or government organizations CSW-IT specialises in offering the Annual Volume License Agreement (AVLA).

Annual Volume License Agreement (AVLA)

Who should purchase this type of license?

Corporate or government organisations that need at least 10 licenses of FileMaker software. This option provides an easy, flexible way to save time and money on volume licensing.

How does it work?

By purchasing an AVLA you are purchasing an annual right to use the software. At the end of the year, you can choose to renew for the next year, purchase the software or de-install the software. If the option is to purchase then a discount is available for each year the software has been installed.

Benefits

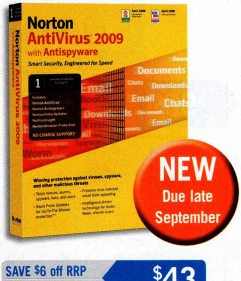
- Purchases can start with a low 10-seat minimum.
- Mix and match platforms, products (including FileMaker Pro, FileMaker Pro Advanced, FileMaker Server, FileMaker Server Advanced) and upgrades for larger tier discounts.
- No minimums for adding seats to an existing VLA.
- Volume licensing savings begin at 13% off single user packages; greater discounts for larger orders.
- The AVLA includes 12 months maintenance.

Norton AntiVirus 2009 - 1 User

Efficient antivirus solution

- Re-engineered for speed
- Smarter for faster, fewer, shorter scans
- Up-to-the-minute protection against spyware, viruses, worms, bots and other threats.
- Easy install in < 1 minute, uses < 10MB of memory.
- Silent mode for games & movies
- FREE phone and online help

3 User (SYM09952) **$77**
5 User (SYM09953) **$111**
10 User (SYM09954) **$172**



NEW Due late September

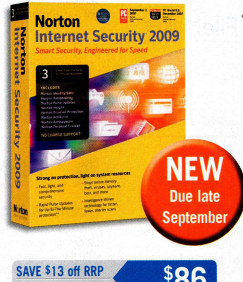
SAVE $6 off RRP
WebCode: SYM9951
$43

Norton Internet Security 2009

Faster than ever before

- Re-engineered for speed
- Rapid install averaging < 1 minute, uses < 10MB of memory.
- Unique technology for faster, fewer scans
- Up-to-the-minute protection against identity theft, spyware, viruses, spam, bots, keyloggers and new threats
- Silent mode for games & movies
- Wireless network security
- Fully configurable

5 User (SYM09957) **$129**
10 User (SYM09958) **$219**



NEW Due late September

SAVE $13 off RRP
WebCode: SYM9956
$86

Norton 360 2.0 All-In-One Security 3 User

Fast PC & internet security in a box!

- Easy security, backup and tuneup for up to 3 P
- Award-winning antivirus, antispyware and firewall protection
- Stronger protection as you shop & bank online
- New wireless network security features
- Flexible backup options now include HD-DVD, Blu-ray Disc, iPod
- 2GB of secure online storage also included

5 User (SYM09927) **$162**
10 User (SYM09928) **$288**



SAVE $25 off RRP
WebCode: SYM9925
$104

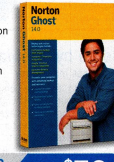
Norton Ghost 14.0

It's back and better than ever

Full system backup - Backs up everything on hard drive or partition

New Features Include:

- FTP backup
- Offsite backup
- Symantec ThreatCon integration
- Exclusive Google Desktop integration
- Exclusive Remote management tool



SAVE $20 off RRP
WebCode: SYM9911
$79

SPECIAL OFFERS FOR SMBs

For a limited time, Symantec is offering SMB customers significant discounts on the cost of our world-leading security, backup and recovery solutions:

SYMANTEC IS
SECURITY

Save 50% off the retail price of Symantec's world leading Endpoint Protection and/or Multi-tier Protection SMB security solutions when you switch from your existing security software to Symantec.

SYMANTEC IS
BACKUP

Save 50% off the retail price of Symantec's world leading backup solutions for SMBs -Symantec Backup Exec and/or Symantec Backup Exec System Recovery when you purchased a minimum 25 user licenses of Symantec Endpoint Protection of Multi-tier Protection security solutions.

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SMB

We understand your business and we have a range of products and solutions to suit the needs of SMB's. Our security and backup software is simple to install, easy to use and can be managed centrally.

A single licensing and maintenance program helps lower cost and our Global Intelligence Network keeps you up-to-date with the lates global, industry and local threats and solutio

TRY TODAY – 60 Day FREE Trial of End Point Protection. Download today at www.symantec.com/ap/citysoftwaredownload

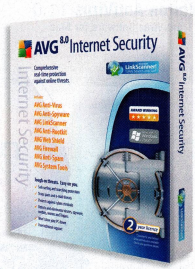
VG Internet Security 8.0 - 3 User

e Ultimate Security Solution

ti-Virus, Anti-Spyware, Anti-Spam, Firewall and kScanner. Identifies and stops threats before they come a problem.

- Real-time protection against all Internet threats
- Real-time security while you surf, search and chat online
- Stops junk e-mail and spam based identity theft attacks
- Top-quality protection that won't slow your system down
- Free local telephone support, plus e-mail support around the clock

User (AVG0006) **$69**
Users (AVG0007) **$145**
Users (AVG0008) **$250**



age for illustration purposes only

SAVE $4 off RRP
WebCode: AVG0009
$78

AVG Anti-Virus Network Edition 8.0 - 5 PCs

Centrally Controlled Anti-Virus Protection

- Protection for workstations and file servers
- Remote administration of all computers on the network
- Centralised installation and configuration with full statistical reporting
- Free local technical support, plus e-mail support around the clock

10 PCs (AVG0012) **$380**
20 PCs (AVG0013) **$660**



*Image for illustration purposes only

SAVE $5 off RRP
WebCode: AVG0011
$199

aspersky Internet Security 009 - 3 User

oven anti-virus protection

spersky Internet Security 8 provides you h the same proven anti-virus protection as spersky Anti-Virus ether with additional tures including rental Control, a rsonal firewall, an i-spam filter, vacy Control d more.



SAVE $15 off RRP
WebCode: KAS0004
$84

BullGuard Internet Security Suite 8.0 3 User

Includes BullGuard Backup + 5GB online storage

Daily updates, super fast scan times, small footprint, firewall, anti-spam, anti-phishing, antispyware.

- Backup includes FREE 5GB online storage, backup while idle, integrates with internet explorer.
- Access your files and data from anyway online. FREE 24 x 7 support with instant chat and remote assistance built all within the program!



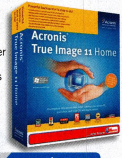
SAVE $19 off RRP
WebCode: BUL0007
$79

Acronis True Image 11 Home

Powerful backup thats easy to do

A complete data protection suite – backup your entire PC, your data, and your OS and applications.

- Try and Decide: easy rollback of system changes.
- Smart Scheduling: start backup when user is idle, login/logout and other events.
- Protect your archives with password-based encryption.



SAVE $11 off RRP
WebCode: MAN0102
$68

rend Micro Worry Free Business Security Advanced - 5 Node

otect your small business and its reputation against data theft, risky websites, and overwhelming spam

r safer, smarter, simpler security blocks web-based threats and other malware to protect your siness assets and customer information. Only Trend Micro offers web threat protection that addresses e exponential growth of web threats with constant updates that won't slow your PCs down.

r knowledge base rapidly deploys to defend all our customers like a global neighbourhood watch. Worry-ee Business Security Advanced includes InterScan Messaging Hosted Security to block spam before it aches your network and protects Microsoft Exchange and Small Business Servers, Microsoft Windows rvers, PCs, and laptops.

Node (TRM9003) **$1139**





ebCode: TRM9002
$569

Apple Mac OS X Leopard

300+ new features

Add a new Mac to your Mac. Mac OS X v10.5 Leopard is packed with over 300 new features, installs easily, and works with the software and accessories you already have. Choose a single-user license for home or office. Alternatively if you have more than one Mac at home, choose the 5 user Family Pack.

5 User (APP0349) **$236**

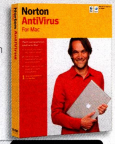


SAVE $10 off RRP
WebCode: APP0350
$148

Norton AntiVirus 11.0

#1 AntiVirus Software for Mac

It removes viruses automatically, cleans infected Internet and email downloads, and protects against advanced online threats and attacks that target newly discovered operating system and application vulnerabilities. Use the enhanced, all new dashboard widget to quickly check your system's virus protection status. Compatible with new Mac OS X v10.5.



SAVE $7 off RRP
WebCode: SYM9799
$52

Parallels Desktop 3.0 - Mac

Run Windows Vista on your Mac

Parallels Desktop for Mac enables you to run Windows, Linux, and more side-by-side with Mac OS X on any Intel-powered Mac, without rebooting. With Parallels' award-winning virtualisation technology, you can run Mac OS X and your favorite Windows applications at the same time. You can even drag-and-drop files between desktops!



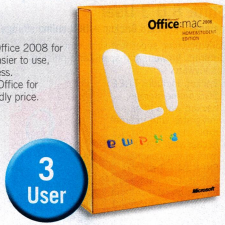
SAVE $12 off RRP
WebCode: PAR0003
$92

Microsoft Office 2008 for Mac Home and Student Edition

3 User Home Office Suite

The perfect Office for families and students. Microsoft Office 2008 for Mac Home and Student Edition is more powerful and easier to use, helping you to achieve more and simplify your day, for less. New features, intuitive new look and compatibility with Office for Windows will unleash your productivity at a budget-friendly price.

- Word 2008
- Excel 2008
- PowerPoint 2008
- Entourage 2008
- Microsoft Messenger



SAVE $40 off RRP
WebCode: MSA3770
$189

MICROSOFT PRICE CHECKER
Harris Technology $198
JB Hi-Fi $227

Microsoft Office 2008 - Mac

Perfect for business

Microsoft Office 2008 for Mac is more powerful and easier to use, helping you to achieve more and simplify your day.

- Word 2008
- Excel 2008
- Powerpoint 2008
- Entourage 2008
- Exchange Support

Upgrade (MSA3774) **$292**



SAVE $155 off RRP
WebCode: MSA3773
$494

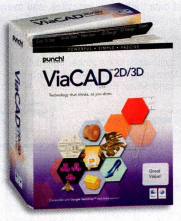
MICROSOFT PRICE CHECKER
Harris Technology $499
Officeworks $649

Punch! ViaCAD 2D/3D

Leader in CAD software for Mac

In ViaCAD, 3D designs automatically create 2D details, plans and elevations with a single mouse click. It creates section and detail views, Bill of Materials lists, and includes complete 3D editing tools, annotation, and dimensions, among many other practical features. The software also delivers industry standard interoperability including Google SketchUp, AutoCAD 2007, Adobe Illustrator and other common 3D formats.

- LogiCursor Thinks As You Draw, Simple interface with LogiCursor technology aids in visually anticipating your moves, partnering with you in the design process.
- 2D/3D Seamless Interface (patent pending), Toggle between 2D and 3D with one mouse click. Start in 2D, add 3D with surface modeling tools. Then click back to 2D, making precision editing a snap.



SAVE $11 off RRP
WebCode: PUN0027
$138

Bento by FileMaker

Databases made easy

Meet Bento, the new personal database from FileMaker that's as easy to use as your Mac. It organises all the details of your busy life in one place. So you can manage contacts, coordinate events, track projects, and prioritize tasks faster and easier than ever before. It's never been easier to get organized thanks to built -in links with Mac OS X.

5 User (FIL2016) **$129**



WebCode: FIL2015
$79

pple iLife 08

try level multimedia suite

fe '08, a major update to Apple's award-nning suite of digital lifestyle applications, ivers significant upgrades to iPhoto, iWeb, rageBand and iDVD, plus a completely nvented iMovie that offers a revolutionary w way to enjoy, t and share ur video.

lser
PP0324) **$126**



SAVE $7 off RRP
WebCode: APP0323
$92

Apple iWork 08 for Mac

Entry level work suite

Apple's amazing productivity suite for the Mac, iWork '08 includes three applications: Pages '08 for word processing with an incredible sense of style; Numbers '08 for powerful, compelling spreadsheets made easy; and Keynote '08 for cinema-quality presentations for everyone.

5 User
(APP0326) **$121**



SAVE $6 off RRP
WebCode: APP0325
$93

icrosoft Office 2008 for ac Special Media Edition

ice Apps & Creative Suite

ice 2008 for Mac Special Media Edition is re powerful and easier use, helping the media vvy Mac user achieve re while simplifying the nagement of digital sets.

grade (MSA3772) **$387**



SAVE $257 off RRP
WebCode: MSA3771
$592

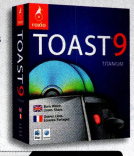
MICROSOFT PRICE CHECKER
Harris Technology $657
Officeworks N/A

Roxio Toast 9 Titanium

Leading Mac burning suite

Compress, convert and compile videos as well as capture audio from any source. Burn discs on the Mac with a host of improved features such as:

- Import and create HD projects
- Burn HD TiVo TV shows and movies
- Stream your recorded home movies and more to your internet connected Mac or PC



SAVE $18 off RRP
WebCode: ROX5009
$161

Top selling Mac software

Accounting		
MYOB AccountEdge	MYB0091	**$523**
MYOB FirstEdge	MYB0090	**$135**
Database Tools		
FileMaker Pro 9	FIL2000	**$477**
FileMaker Pro 9 5-User	FIL2003	**$1914**
FileMaker Pro 9 5-User Upg	FIL2004	**$1134**
FileMaker Pro 9 Academic	FIL2002	**$294**
FileMaker Pro 9 AE 5-pack	FIL2005	**$1182**
FileMaker Pro 9 Adv AE	FIL2008	**$479**
FileMaker Pro 9 Advanced	FIL2006	**$756**
FileMaker Pro 9 Adv Upg	FIL2007	**$473**
FileMaker Pro 9 Upgrade	FIL2001	**$288**
FileMaker Server 9 Upgrade	FIL2010	**$939**
Design Tools		
Corel Painter X	COR8700	**$598**
Corel Painter X Academic	COR8702	**$132**
Corel Painter X Upgrade	COR8701	**$335**
Extensis Suitcase Fusion 12	EXT0084	**$169**
Enfocus PitStop Pro 7.2	ENF0003	**$1155**
Punch! Home Design Studio	PUN0020	**$170**
QuarkXPress 8	QUA0059	**$1275**
QuarkXPress 8 Academic	QUA0061	**$159**
QuarkXPress 8 Upgrade	QUA0042	**$472**
Education		
Britannica 2008 Ref Suite	MND1181	**$89**
Mavis Beacon Typing 17	BRD0030	**$50**
Graphic Suites - Student Editions		
Adobe CS3.3 Design Premium	ADS0018	**$419**
Adobe CS3.3 Design Standard	ADS0020	**$280**
Adobe CS3.3 Master Collection	ADS0022	**$697**
Adobe CS3 Production Premium	ADS0012	**$422**
Adobe CS3 Web Standard	ADS0014	**$282**
Multimedia		
I-Studio for iPOD	MAN0104	**$28**
NewTek LightWave 3D v9.3	NEW0020	**$1299**
Roxio Crunch	ROX5001	**$68**
Roxio Popcorn 3 for Mac	ROX5003	**$68**
Photo Editing (Adobe)		
Photoshop CS3 Ext Student	ADS0016	**$216**
Photoshop Lightroom 2	ALD9662	**$386**
Photoshop Lightroom 2 Upg	ALD9582	**$139**
Photoshop Lightroom 2 Edu	AEP9567	**$162**
Productivity (Adobe)		
Acrobat 9 Professional Edu	AEP9555	**$182**
Acrobat 9 Professional	ALD9649	**$382**
Acrobat 9 Pro Upgrade (Pro)	ALG9566	**$203**
Acrobat 9 Pro Upgrade (Std)	ALG9585	**$203**
System Tools		
Alsoft DiskWarrior 4.00	ALS0003	**$143**
Alsoft DiskWarrior 4.00 Upg	ALS0009	**$88**
Web/Internet		
Adobe Dreamweaver CS3	ALD0082	**$575**
Adobe Fireworks CS3	ALD0084	**$432**
Microsoft Expression Studio	MSS0082	**$934**
Mr Sites - Internet In a Box	MRS0001	**$99**

pple Aperture 2

ofessional RAW photo editor

erture 2 gives photographers incredible ols to manage massive libraries, speed rough photo edits, make essential image justments, and deliver photos online and print using one mple, integrated rkflow. Whether u shoot RAW or EG, Aperture s you get the ost out of your otography.



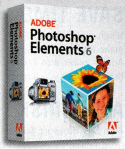
WebCode: APP0372
$259

Adobe Photoshop Elements 6

Top selling home photo editor

Adobe Photoshop Elements 6 software for Macintosh combines power and simplicity so you can go beyond the basics. Make your photos look their best, share them in creative ways, and easily find and view them. Photoshop Elements also works great with iPhoto.

Academic
(AEP9552) **$76**



SAVE $40 off RRP
WebCode: ALD9636
$109

How do I buy software licenses?

Three popular ways to buy software licenses.

FULL PACKAGED PRODUCT (FPP)

SUITED FOR HOME USE AND FOR SMALL BUSINESSES THAT NEED LESS THAN 5 LICENSES.

Full Packaged Product (FPP) is software that you buy off the shelf in store or from buying through our online store. Each box contains a copy of the software that you install on your computer and one or more licenses. This option is ideal for the home user and small businesses that need less than five software licenses.

ORIGINAL EQUIPMENT MANUFACTURERS (OEM)

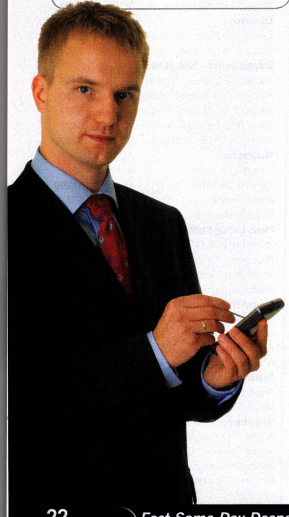
SUITED TO HOME USERS AND ORGANISATIONS WITH MINIMAL HARDWARE REQUIREMENTS.

With OEM you will receive the software already installed when you buy the hardware (such as a laptop). The software licenses are attached and owned by the computer as opposed to FPP which is owned by the purchaser. That means the software cannot be transferred to another computer. This option is suited to home users and organisations with minimal hardware requirements.

VOLUME LICENSING

SUITED TO SMALL/MEDIUM BUSINESS WHO REQUIRE 5 OR MORE LICENSES.

A software license acquired through Volu Licensing is a simple and cost-effective v to purchase multiple licenses under a sin agreement. Volume Licensing offers volu discounts and provides an effective way you to add the latest products and upgrades your business. This is best suited to busines that plan to grow their business over ti helping to provide a seamless IT manageme and procurement process. Licenses can transferred from one computer to another, a organisations with as few as 5 PCs will ben from this option.



Benefits of Volume Licensing

SAVE MONEY

The equation with volume licensing is very simple – the more you buy, the more you save. Businesses sometimes confused trying to understand the different ways that volume licensing discounts are appl This is where City Software and CSW-IT serve Australia best. For over 16 years City Software has se Australian businesses' software needs with excellence making City Software one of Australia's wi recognised licensing experts on over 50 licensing programs.

Businesses can also save money by standardising software and purchasing software maintena or support programs such as Software Assurance and Upgrade Protection. When purchasing th additional programs you may also benefit from receiving free training, support services and home rights whilst receiving the biggest benefit of all ... access to new upgrades that arise during your ac agreement term.

SAVE TIME

When compared to FPP, purchasing volume licensing is less time consuming. Rather than havin make multiple purchases you can consolidate all your purchases into one software licensing agreem Adding users also takes no time at all. Simply purchase extra licenses and make the installations the media kit you already have.

AVOID RISK

With City Software & CSW-IT's assistance we will ensure that you are legally compliant with the soft manufacturer's agreements. We also track your purchases, becoming your Software License Watch reducing the risk of you over-purchasing – a common trap for small/medium businesses.

's as easy as 1-2-3

FIND A SOLUTION

We assist you in selecting the best suited software for your business. Contact one of our licensing consultants on 1300 658 600 or via email at licensing@citysoftware.com.au

REQUEST A QUOTE

We will prepare a quote for you that is sure to be unbeatable. In most cases a quote will be prepared for you by the end of the day.

RECEIVE LICENSES

An email will be sent containing the license keys. Expected times may vary from product to product due to vendor licensing processing time. If physical media has also been ordered this will be despatched by courier in a timely manner.

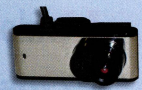


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nero
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Business Objects an SAP® company
Autodesk®
symantec.
COREL™
Quark Authorized Reseller
AVG
SmartDraw®

Related Products

Mini USB Notebook Webcam



SAVE $44 off RRP
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$24.95

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SAVE $4 off RRP
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GNX LCD Cleaning Kit



SAVE $4 off RRP
WebCode: GNX0001
$15

Targus Notepac 200 Edition 15"



SAVE $14 off RRP
WebCode: TAR0001
$45

Logitech V20 USB Notebook Speakers



SAVE $21 off RRP
WebCode: LOG3508
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Perfect for home use

2.13GHz Intel Celeron
1GB Memory
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5-in-1 Card Reader
Vista Home Basic
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$200* Cashback!



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Kingston RAM UPGRADE
UPGRADE TO 2GB RAM FOR ONLY $59
WebCode: KNM4333

SAVE $230 off RRP
WebCode: COP0792
You Pay $669
$469
After $200 Cashback

Acer Aspire One Notebook

Ultraportable at a great price

1.6GHz Intel Atom
1GB Memory
120GB Hard Drive
Webcam Built In
XP Home
8.9"
$99* Cashback



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SAVE $130 off RRP
WebCode: ACN1458
You Pay $668
$569
After $99 Cashback

Asus Eee PC 901 Notebook

Perfect for students!

1.6GHz Intel Atom
1GB Memory
12GB SSD Drive
Webcam Built In
XP Home
8.9"



WebCode: ASU1042
$669

Compaq C791WU Notebook

Great for Web!

1.86GHz Intel Dual Core
2GB Memory
200GB Hard Drive
Webcam Built In
Vista Home Premium
15.4"
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WebCode: COP0791
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$775
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Lenovo SL500 ThinkPad

Robust & durable solution

1.8GHz Intel Core 2 Duo
1GB Memory
160GB Hard Drive
Bluetooth Built In
Vista Business
15.4"



Kingston RAM UPGRADE
UPGRADE TO 2GB RAM FOR ONLY $63
WebCode: KNM6671



SAVE $50 off RRP
WebCode: LEN0114
$1099

HP DV4-1004TU Notebook

HP Quality and service

2.26GHz Intel Core 2 Duo
2GB Memory
250GB Hard Drive
Webcam Built In
Vista Home Premium
$100* Cashback!



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Kingston RAM UPGRADE
UPGRADE TO 4GB RAM FOR ONLY $79
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SAVE $136 off RRP
WebCode: HPR1003
You Pay $1263
$1163
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cer 5620 Extensa

Pro Stability

2.2GHz Intel Core 2 Duo
2GB Memory
250GB Hard Drive
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XP Professional
$99* Cashback!
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$999
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Acer 5620G Extensa

Built for perfomance

2.1GHz Intel Core 2 Duo
2GB Memory
250GB Hard Drive
ATi HD2400XT 256MB
Vista Home Premium
15.4"

Kingston RAM UPGRADE
UPGRADE TO 4GB RAM FOR ONLY $99
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SAVE $336 off RRP
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$1163

P DV3116TX Notebook

wer & portability

1.86GHz Intel Dual Core
2GB Memory
320GB Hard Drive
luetooth Built In
Vista ome Premium
$100* Cashback!
13.3"

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You Pay $1264
$1164
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Lenovo T400 ThinkPad

Fingerprint security

2.24GHz Intel Core 2 Duo
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160GB Hard Drive
Fingerprint Reader
Vista Business
BONUS 160GB HDD Or $150 Fuel Voucher
14.1"

Kingston RAM UPGRADE
UPGRADE TO 4GB RAM FOR ONLY $226
WebCode: KNM2735

SAVE $100 off RRP
WebCode: LEN0116
$2099

pple MacBook Air

traight, Ultrathin

1.6GHz Intel Core 2 Duo
2GB Memory
80GB Hard Drive
Webcam Built In
OSX10.5 Mac Leopard
World's Thinnest Notebook
13.3"

AVE $118 off RRP
ebCode: APP0360
$2381

Lenovo T400 ThinkPad

Packed with features

2.4GHz Intel Core 2 Duo
2GB Memory
250GB Hard Drive
Bluetooth Built In
Vista Business
BONUS 160GB HDD Or $150 Fuel Voucher
14.1"

Kingston RAM UPGRADE
UPGRADE TO 4GB RAM FOR ONLY $226
WebCode: KNM2735

SAVE $110 off RRP
WebCode: LEN0117
$2389

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Unitech Notebook Stand & Cooling Pad
SAVE $10 off RRP
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$39.95

Logitech VX Nano Cordless Mouse
SAVE $31 off RRP
WebCode: LOG3653
$98

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SAVE $21 off RRP
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$58

Targus XL 17" Notebook Bag
SAVE $33 off RRP
WebCode: TAR0322
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Targus BlackTop Messenger Case
SAVE $15 off RRP
WebCode: TAR0131
$54

Related Products

Cyber Acoustics 2.0 Amplified Computer Speaker System



WebCode: CYB1002 — $19.95

Targus 100W Auto Power Inverter Cupholder Style



SAVE $32 off RRP — WebCode: TAR5083 — $97

Belkin Notebook Security Lock



SAVE $16 off RRP — WebCode: BEL2583 — $33

Belkin Surge Cube



SAVE $6 off RRP — WebCode: BEL0244 — $23

Targus Urban Overnight Roller



SAVE $44 off RRP — WebCode: TAR5099 — $155

AVLabs USB Digital TV Tuner



SAVE $20 off RRP — WebCode: AVL1013 — $44.95

HP DV5-1053TX Notebook

All the features you could need



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Kingston RAM UPGRADE — UPGRADE TO 4GB RAM FOR ONLY $79 — WebCode: KNM2591

SAVE $130 off RRP — WebCode: HPR1053 — You Pay $1368 — $1269 — After $100 Cashback

Acer 6920G Gemstone Blue

Breathtaking design



Kingston RAM UPGRADE — UPGRADE TO 4GB RAM FOR ONLY $99 — WebCode: KIN0021

SAVE $245 off RRP — WebCode: ARN0004 — $1654

Lenovo SL500 Notebook

Built to last!



Kingston RAM UPGRADE — UPGRADE TO 4GB RAM FOR ONLY $198 — WebCode: KNM10044 x 2

SAVE $83 off RRP — WebCode: LEN0115 — $1816

HP DV5-1056TX Notebook

Watch Blu-Ray on your notebook



*See citysoftware.com.au/promotions

SAVE $162 off RRP — WebCode: HPR1056 — You Pay $2236 — $2137 — After $100 Cashback

Asus M50VM Notebook

Outstanding performance



SAVE $35 off RRP — WebCode: ASU1033 — $2164

Apple MacBook Pro

Pure beauty, Pure design



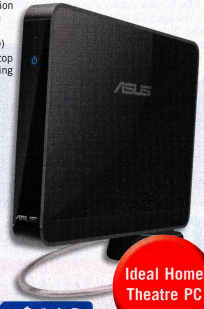
Kingston RAM UPGRADE — UPGRADE TO 4GB RAM FOR ONLY $79 — WebCode: KNM10047

SAVE $204 off RRP — WebCode: APP0379 — $3595

sus Eee Box PC

ergy Efficient, Earth-loving PC

The world's smallest PC at 1 Litre, 1Kg
Instant web-surfing with 5 Seconds boot-up time
8x faster access with Wireless N
Green IT: 90% reduction in Power consumption
Zero Footprint (mounts to a TFT LCD)
Simple compact desktop for affordable computing



1.6Ghz Intel Atom
1GB Memory
80GB Hard Drive
XP Home

AVE $429 off RRP
ebCode: ASD0008
$419

Apple iMac 20" Desktop

The all new, all-in-one iMac

Setting the highest standards for elegance and simplicity, the all-in-one iMac packs all its components from processor to video camera into an astoundingly thin, anodized aluminum frame.



2.4Ghz Intel Core Duo
1GB Memory
250GB Hard Drive
X10.5 Mac OS

SAVE $15 off RRP
WebCode: APP0399
$1584

Kingston RAM UPGRADE
UPGRADE TO 2GB RAM FOR ONLY $45
WebCode: KNM2580

Lenovo ThinkCentre M57 6072

Perfectly suited for business

ThinkCentre M57 system offers industry-leading technologies, excellent management capabilities and IBM service and support.



2Ghz Intel Dual Core
1GB Memory
160GB Hard Drive
Vista Business
Includes XP Downgrade

SAVE $211 off RRP
WebCode: LED0042
$868

Kingston RAM UPGRADE
UPGRADE TO 2GB RAM FOR ONLY $45
WebCode: KNM3641

7 R19W12
9" LCD Monitor

ear picture at a budget price



1440x900 Resolution
5ms Response Time
300 cd/m2 Brightness
700:1 Contrast Ratio

SAVE $60 off RRP
WebCode: V7G1000
$259

Samsung 943N
19" LCD Monitor

Quality brand, Quality picture



1280x1024 Resolution
5ms Response Time
300 cd/m2 Brightness
1000:1 Contrast Ratio

SAVE $60 off RRP
WebCode: SAM2943
$269

Asus VW192TG
19" LCD Monitor

Glass hardness protection



1440x900 Resolution
5ms Response Time
330 cd/m2 Brightness
800:1 Contrast Ratio

SAVE $78 off RRP
WebCode: ASM0021
$271

Asus VW222s
22" LCD Monitor

erfect for gaming



1680x1050 Resolution
2ms Response Time
300 cd/m2 Brightness
2000:1 Contrast Ratio

SAVE $51 off RRP
WebCode: ASM0048
$298

Acer X213WB
21.6" LCD Monitor

Designed for business



1680x1050 Resolution
5ms Response Time
300 cd/m2 Brightness
2500:1 Contrast Ratio

SAVE $170 off RRP
WebCode: ACM0104
$299

Samsung 245B
24" LCD Monitor

Great for CAD & graphics



1920x1200 Resolution
5ms Response Time
400 cd/m2 Brightness
3000:1 Contrast Ratio

SAVE $192 off RRP
WebCode: SAM2245
$597

MGE Evolution 650VA 1U Rack Mount UPS

Protection for 1 to 15 servers

- High density protection for network devices
- 4 IT Standard IEC output sockets
- Ideal for Network devices, Rack-mounted servers, conventional rack-mounted or tower servers & Network storage systems
- Line Interactive UPS
- Software & rail kit Included
- USB & Serial Ports

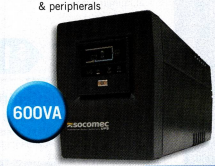


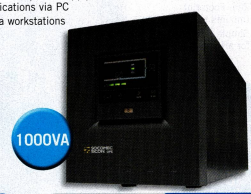
SAVE $49 off RRP
WebCode: MGE0081
$473

Socomec Netys PE Series Line Interactive UPS

Effective, stabilised protection for Home & SMB

- Integrated Automatic Voltage Regulation
- 3 IT Standard IEC sockets (4 x IE sockets with 1000VA model)
- Telephone line/mode/ADSL protection with RJ11 connection
- Communication panel with LEDs for easy display of operation conditions
- Serial & USB connections for management of power supply and control automatic shutdown of applications via PC
- Suits monitors, workstations, multimedia workstations & peripherals





SAVE $20 off RRP
WebCode: SOC1001
$119

SAVE $28 off RRP
WebCode: SOC1002
$241

Did you know that more than 30% of computer failures are caused by power problems!

Protect your valuable electronic equipment today with an Uninterruptible Power System (UPS). These UPS's provide protection against power surges and sags and also filter the power from over and under voltages, enabling clean stable mains to your equipment. With the battery backup that gives you time to safely shut down your PC in the event of a power outage, they truly are a necessary addition to every home / office system.

Digitek 8 Way Surge Board



SAVE $20 off RRP
WebCode: BIT0001
$39.95

Belkin AC Anywhere DC to AC Power Inverter 300 Watt



SAVE $20 off RRP
WebCode: BEL4123
$79.95

Kensington Travel Adapter



SAVE $5 off RRP
WebCode: KEN0655
$39.95

APC Back-UPS ES 700VA

Protect your PC from data loss

Best value for protecting your home and home office computer systems from power and data loss.

500VA (APC3500) **$167**



$191
SAVE $69 off RRP
WebCode: APC3501

APC Back-UPS RS 1500VA

High Performance Battery Backup & Protection

The perfect unit to protect your business productivity from the constant threat of power problems and lost data.

1000VA (APC0053) **$660**



$682
SAVE $137 off RRP
WebCode: APC0054

APC Smart-UPS SC 1000VA

Performance Power Protecti for Servers

Protect critical data by supplying reliable, network-grade power in either tradition tower or rack-optimized form factors

1500VA (APC0211) **$1012**



$847
SAVE $178 off RRP
WebCode: APC3808

cer X1160Z DLP Data rojector

eat for presentations

Extra portable and excellent colour reproduction o form the ultimate presentation tool.
Well suited for the most demanding Multimedia presentation applications.



AVE $151 off RRP
ebCode: ACP1163
$748

Epson EMP S5 LCD Projector

Superb quality at an affordable price

- Designed specifically to get the best out of your presentations
- Low power consumption of 231W and just 5.8W in standby mode 2 year warranty



SAVE $241 off RRP
WebCode: EMP0005
$958

ViewSonic 3-LCD Data Projector

Deliver powerful presentations

- Connect a computer or add a video source for dynamic meetings and presentations
- Capable of displaying HDTV signals Bright choice for mobile presenters



SAVE $280 off RRP
WebCode: VIE5014
$1419

anasonic 32" ull HD LCD TV

tstanding picture quality

nowned Full-HD TV featuring outstanding ture quality delivered through a High solution Panel.



AVE $263 off RRP
ebCode: PAN0164
$1763

Panasonic 37" Full HD LCD TV

A TV that's not to big but not too small

LCD technology continues to bright images ideal for smaller rooms and brightly lit environments.



SAVE $517 off RRP
WebCode: PAN0165
$2482

NEC 40" Full HD LCD TV

Perfect for office or home theatre

With superb sound and superior picture quality an excellent addition to any Home Theatre environment.



SAVE $481 off RRP
WebCode: NEC0063
$1718

lercury AV DMI Cable 1.5m

ceptional quality & price

u can depend on the performance and liability of Mercury AV cables to enhance ur audio visual experience significantly.

HDMI (MER0002) **$48**
HDMI (MER0003) **$62**
m HDMI (MER0004) **$96**
Component ER0007) **$59**
m Component ER0006) **$89**



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ebCode: MER0001
$34

Kaiser Baas Dual Digital TV Tuner

Watch one channel whilst recording another

Plug this stick into an available USB slot on your PC or notebook, and schedule, record, time-shift and watch two of your favourite TV shows.



SAVE $23 off RRP
WebCode: KAB0021
$126

Dvico TViX PVR 2230 HDTV

World's smallest Analogue & DVB-T PVR

- High Definition up to 1080i
- HDMI 1.1 / Composite ports
- Optional wireless LAN extension thru USB port



SAVE $34 off RRP
WebCode: DVC0039
$365

Microsoft Wired Desktop 500

Great value for money

Enjoy one-touch access to e-mail, the Web, and frequently-used features. Control media activities with the touch of a button, and work worry-free with new spill-resistant design.



SAVE $6 off RRP
WebCode: MST8412
$33

MICROSOFT PRICE CHECKER
Dick Smith $39.95
Harris Technology $39.95

Microsoft Wireless Optical Desktop 700 v2

Best value wireless mouse & keyboard

Enjoy freedom from desk clutter with an optical mouse and a compact keyboard design in Microsoft's most affordable wireless desktop.



SAVE $8 off RRP
WebCode: MST8249
$41

MICROSOFT PRICE CHECKER
Dick Smith $49.95
Harris Technology $49.95

Microsoft Wireless Laser Desktop 4000

Leather feel cushion wrist rest

The Comfort Curve keyboard helps your hands rest in a more natural position and with the High Definition Laser mouse, your desktop is ready for work and play.



SAVE $23 off RRP
WebCode: MST8460
$106

MICROSOFT PRICE CHECKER
JB Hi-Fi $129
Dick Smith $127

Microsoft Digital Media Keyboard 3000

Optimised for Windows Vista Flip 3D

Designed to fit the digital lifestyle, allowing users to bring digital media to life with one-touch access to photos, Windows Media Player, My Favorites Keys and Zoom.



SAVE $8 off RRP
WebCode: MST8485
$41

MICROSOFT PRICE CHECKER
Dick Smith N/A
Officeworks $49.95

Microsoft LifeCam VX-1000

High quality picture

With simple setup and one-touch calling, the Microsoft LifeCam VX-1000 makes it easier than ever to see and hear your friends and family over the Internet.

- 640 x 480 @ 30 fps
- Built in microphone
- USB Connection
- Windows Compatible



SAVE $15 off RRP
WebCode: MST8430
$44

MICROSOFT PRICE CHECKER
JB Hi-Fi $48
Officeworks $59

Microsoft LifeCam NX-3000

Ideal for notebooks

This sleek, compact webcam is designed for notebook computers, making it easier than ever to keep in touch with friends and family anywhere.

- 640 x 480 @ 30 fps
- High Definition 1.3 megapixel still photos
- Built-in microphone
- Automatic face tracking cancellation



SAVE $25 off RRP
WebCode: MST8476
$54

MICROSOFT PRICE CHECKER
Harris Technology $79
Officeworks $58

Microsoft Basic Optical Mouse - Black

Optical technology at a great price

Replace that old-fashioned "roller ball" with a mouse that works on virtually any surface. It's easy to use, comfortable, and features a scroll wheel.



SAVE $7 off RRP
WebCode: MST8404
$17

MICROSOFT PRICE CHECKER
Officeworks $19.95
Dick Smith $24.95

Microsoft Wireless Notebook Optical Mouse 3000

Designed for a portable lifestyle.

Go mobile with this portable ergonomic mouse. Easily enlarge and edit details with the new magnifier and scroll four ways with the innovative 4-way scrolling.



SAVE $12 off RRP
WebCode: MST8420
$37

MICROSOFT PRICE CHECKER
Harris Technology $39.95
Officeworks $39.95

Microsoft Mobile Memory Mouse 8000

USB Flashdrive with 1GB Memory

This comfortable, ground-breaking mouse is the most advanced mobility tool available. Its transceiver also has a 1 GB Flash Memory, which frees up USB ports and lets you easily back up and transfer files.



SAVE $27 off RRP
WebCode: MST8472
$122

MICROSOFT PRICE CHECKER
Harris Technology $129
Officeworks $129.95

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Discover the Differen
Microsoft Hardwa

lip 2GB MP3 Player

sy to use

sten to your favourite music on the go with e Clip 2GB MP3 player.

- Simple & trendy Clip design
- OLED LCD display
- Built-in Lithium rechargeable battery
- Includes Stereo Headphones



AVE $69 off RRP
ebCode: SIG0010
$19.95

Apple iPod nano 8GB Pink

Small iPod with one very big idea

It's the small iPod with one very big idea: Video. Now the world's most popular music player lets you enjoy TV shows, movies, video podcasts, and more. The larger, brighter display means amazing picture quality. In eye-catching colors, iPod nano is stunning all around.

Black (APP0337) **$239**
Green (APP0336) **$239**
Blue (APP0335) **$239**



SAVE $10 off RRP
WebCode: APP0380
$239

Edifier S330 2.1 Speaker System

Listen to music in style

Piano-finished 2-way wooden enclosure
18W satellites and a huge 40W 6.5" wooden enclosure sub-woofer.



SAVE $60 off RRP
WebCode: EDI0004
$139

yber Acoustics Noise ancelling Headphones

ystal clear sound

- Stereo headphones
- Active noise cancelling circuit
- Custom comfort fit
- Carrying pouch
- Airline plug adapter included
- AAA battery included



AVE $40 off RRP
ebCode: CYB1000
$49.95

AVLabs MYTube Video Speakers for iPod

Audio Visual iPod dock

Featuring an awesome 7" widescreen display, the MyTube takes your iPod video and images to a whole new level of enjoyment

- 3-in-1 CARD READER (SD/MMC/MS)
- Supports video, music playback and photo viewing



*iPod not included

SAVE $58 off RRP
WebCode: AVL1012
$341

AVLabs 1.5" Digital Photo Frame Keyring

Keep your photos in your pocket

This petite and fun photo frame has a 1.5" LCD screen allowing you to display up to 80 of your digital images as a slideshow



SAVE $10 off RRP
WebCode: AVL1011
$19.95

aiser Baas 8" Photo rame Woodgrain

ew all your favourite photos

is Photo frame looks to impress with its nber frame.

- Supports memory Cards up to 8GB
- Supports images up to 16MB
- Includes remote
- 800 X 600 Resolution



AVE $34 off RRP
ebCode: KAB0020
$195

10.4" Digital Photo Frame Black

Enjoy your favourite memories

This 10.4" digital photo frame is one of the most feature packed photo frames on the market, with 1GB of onboard storage.

- 800 x 600 Resolution
- Photo, Audio, Video playback
- SD, MMC, MS, XD, CF card support
- Built in speakers

10.4" Digital Photo White
(SIG0019) **$209**



SAVE $140 off RRP
WebCode: SIG0020
$209

Ality 15" Touch Screen Photo Frame

An art gallery in a picture frame

Schedule set different photos or pictures to display anytime you want.

- Pre-installed with over 2000 images in almost every genre.
- 2GB Memory
- 1280x1024 Resolution
- IR Remote, Touchscreen, Auto Tilt
- Wall Mountable



SAVE $50 off RRP
WebCode: ALI1007
$449

Related Products

Sandisk Memory Cards

Standard SD

2GB (SAN0030) **$12**
4GB (SAN0115) **$20**
8GB (SAN0116) **$36**



Ultra II SD

2GB (SIM0457) **$14**
4GB (SAN0098) **$24**
8GB (SAN0101) **$45**



Ultra II Compact Flash (CF)

2GB (SIM0691) **$28**
4GB (SAN0023) **$39**
8GB (SAN0037) **$81**



Memory Stick Pro Duo

2GB (SAN0028) **$23**
4GB (SAN0053) **$39**
8GB (SAN0120) **$75**



Ultra II Memory Stick Pro Duo

2GB (SAN0046) **$30**
4GB (SAN0066) **$50**



Extreme III SD

2GB (SAN0112) **$30**
4GB (SAN0125) **$44**
8GB (SAN0126) **$85**



Extreme III Compact Flash

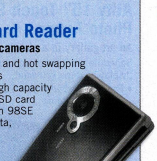
2GB (SAN0106) **$38**
4GB (SAN0107) **$67**
8GB (SAN0108) **$97**
16GB (SAN0157) **$187**



All in one USB 2.0 Card Reader

Read cards from cameras

- True plug & play and hot swapping
- M2 direct access
- Support NEW high capacity standard SDHC SD card
- Support O/S: Win 98SE ME 2000/XP/Vista, MAC OS 8.6 & above



SAVE $14 off RRP
WebCode: SIG0008
$15

Canon IXUS 85 IS - Silver

Personalised Style for Capturing Fun

- The IXUS 85 IS has powerful presence and performance and will certainly stand out in a crowd.
- Advanced technologies include Optical Image Stabilizer, Motion Detection Technology and Noise Reduction Technology.



SAVE $32 off RRP
WebCode: CAN2019
$347

Sony DSCW150S - Black

Robust Quality

- Intelligent Scene mode which automatically selects the right settings for your environment.
- Smile Shutter technology is also included, letting you instantly capture smiles the moment they happen.



SAVE $73 off RRP
WebCode: SNY7618
$306

Sony Cyber-shot DSC-T70S Silver

Superb clarity in all situations

- HD output, photos can look even more spectacular
- The innovative Carl Zeiss lens brings the action close while the Face Detection feature optimises natural tones in faces.



SAVE $28 off RRP
WebCode: SNY1292
$371

Olympus Tough 1030SW Bla

Great for Outdoor Adventures

- Waterproof up to 3m and shockproof up to 2m
- New underwater movie mode
- Wide angle lens for even broader shooting.



SAVE $72 off RRP
WebCode: OLY0147
$527

Canon EOS 1000D Digital SLR Single Lens Kit

The Enthusiasts Choice

- Canon developed CMOS sensor and DiG!C III Image Processor combine to deliver the high image quality for first time DSLR users.
- LiveView offers the familiarity of a compact camera, enabling the photographer to preview images in real time and to compose images in confined spaces or over crowds.

NEW

10.1 Megapixel
18-55m Lens
2.5 LCD Screen



SAVE $52 off RRP
WebCode: CAN8101
$947

UJIFILM FinePix J10 Digital Camera

MegaPixel at a great price

Pictures are sharp, clear, and vivid, perfect for enlarged display or printing

A compact performer lets you enjoy a range of picture-aking options, from atmospheric wide-angle scenes to dramatic close-ups



AVE $35 off RRP
ebCode: FJI0081
$134

UJIFILM FinePix Z20fd Digital amera - Green

autiful photos in any scene

ust frame and snap! Fast Face Detection automatically d accurately finds and focuses faces with just the right ghtness and without "Red Eye"!

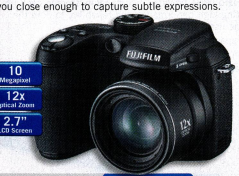


AVE $13 off RRP
ebCode: FJI0082
$236

UJIFILM FinePix S1000fd igital Camera

eat for Semi-Professionals

12x optical zoom lens expands your shooting reach, bringing ou close enough to capture subtle expressions.



AVE $18 off RRP
ebCode: FJI0083
$311

LTO Ultrium 1 100/200GB

- Low error rates
- Lower head wear
- Enhanced reliability



WebCode: FJI0027

LTO Ultrium 2 200/400GB

- Superior durability
- Lower head wear
- High transfer speed



WebCode: FJI0028

LTO Ultrium 3 400/800GB

- Large storage capacity
- Enhanced reliability
- FujiFilm servo technology



WebCode: FJI0029

LTO Ultrium 4 800GB/1.6TB

Increased cartridge capacity NANOCUBIC thin-film coating process.



WebCode: FJI0062

DAT72 170m 36/72GB

Powered by Fujifilm's exclusive ATOMM technology. Reliable backup and long term archiving using 4S structure



WebCode: FJI0042

DDS has become the world standard for storing and backing up computer data on tape and now you can enjoy even higher capacity, higher output, and higher reliability than ever before. Remarkably low error rates, high output and MRS (Media Recognition System for assured reliable performance) are all characteristics of the Fujifilm DG Series.

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FUJIFILM
DATA MEDIA
NEEDS
CALL
1300 761 761
CSW-IT

DDS DG-90m 1.3/2.6GB



WebCode: FJI0037

DDS DG-120m 4/8GB



WebCode: FJI0038

DDS3 DG-125m 12/24GB



WebCode: FJI0039

DDS4 DG-150m 20/40GB



WebCode: FJI0040

LaCie 250GB Mobile Disk Hard Drive

Store & exchange anywhere

The ideal travel companion for your computer, the LaCie Mobile Disk delivers generous storage capacities at an affordable price

- USB bus-powered
- MacOS X 10.3, Microsoft Windows Vista / 2000 / XP
- Includes backup software



320GB (LAC1138) **$181**

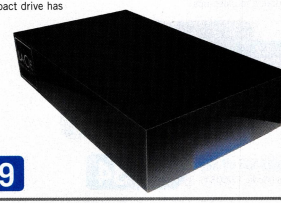
SAVE $30 off RRP
WebCode: LAC0793
$129

LaCie 750GB Hard Disk Design by Neil Poulton

Sophisticated style

Designed by Neil Poulton, this hard disk adds sophisticated style to your desktop yet its presence is quiet and unobtrusive. It has a unique distinguishing feature - a cool, blue LED strip on its underside that creates an ambient glow. Its subtle, all-black design blends perfectly into dark hom entertainment setups and workstations. Very small for its vast capacity, this lightweight, compact drive has a fashionable, mirror-polished finish.

- USB Connectivity
- MacOS X 10.3 or later, Windows Vista / 2000 / XP
- Includes one click backup software



1TB (LAC1132) **$251**

SAVE $20 off RRP
WebCode: LAC1147
$229

LaCie 320GB Rugged All Terrain Hard Disk

Great for tradesmen

The unique scratch-protected aluminum shell and shock-resistant rubber bumper make the LaCie Rugged Hard Drive especially resistant to harsh elements for extra protection along the road of your adventures.

- FireWire 800, IEEE1394 FireWire, USB connectivity



250GB (LAC2005) **$191**

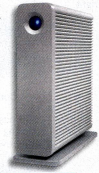
SAVE $66 off RRP
WebCode: LAC1140
$233

LaCie d2 1TB Quadra Hard Disk

Great connectivity options

The LaCie d2 Quadra Hard Disk provides an incredible 1TB capacity in a relatively compact device.

- FireWire 800, FireWire 400, Hi-Speed USB 2.0 Connectivity
- Quadruple interface PC/Mac compatibility
- Interface bandwidth up to 3Gbits/s (eSATA)



500GB (LAC9883) **$228**

SAVE $45 off RRP
WebCode: LAC1143
$334

LaCie 2big 1TB Network (2-disk RAID)

Design by Neil Poulton

The 2big Network can act as a file-sharing server, a backup server or an FTP server. Easi share important files and make them accessit from anywhere via FTP or any web browser. With this affordable 2-disk RAID solution with Ethernet interface, get maximum storage capacity in BIG mode or maximum security in SAFE mode



2TB (LAC1124) **$926**

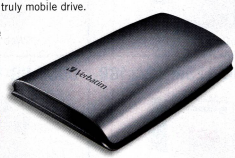
SAVE $62 off RRP
WebCode: LAC1123
$537

Verbatim 320GB 2.5" USB 2.0/Firewire Portable Hard Drive

Weighs only 150g

Store and carry your digital and day to day working files on this truly mobile drive.

- Transfer data easily between home & office
- Safely back up your PC or laptop
- Nero BACKITUP 2 Essentials back up software included



120GB (VBM9527) **$99**
160GB (VBM9528) **$110**
250GB (VBM9529) **$145**

SAVE $109 off RRP
WebCode: VBM9530
$155

Verbatim 500GB 3.5" USB 2.0 Portable Hard Drive

Nero back up software included

Verbatim's External Hard Drive provides high capacity storage back up for all file types offering high performance and reliability to both the professional and home user.

- Sleek 'black steel' space saving design
- Windows Vista Compatible
- Verbatim 2 Year Warranty



750GB (VBM7511) **$172**

1TB (VBM512) **$237**

SAVE $28 off RRP
WebCode: VBM7510
$126

axtor 160GB OneTouch 4 Mini Hard Drive

rtable OneTouch Backup

ull-featured, portable backup and storage solution with Maxtor
etyDrill for complete recovery of your PC hard drive's contents in case
a system crash or virus.
deal backup and storage for carrying your
igital portfolio with you
wo levels of security against
nauthorized use -
Maxtor DrivePass & data
ncryption
ustomizable Maxtor
neTouch button

0GB (MXT4024) **$169**



WebCode: MXT4023 **$119**

Maxtor 640GB OneTouch 4 Plus Hard Drive

Additional storage for your PC

Provide a safe haven for your entire working environment with a Maxtor OneTouch 4 Plus personal storage solution. To prepare in case of a system crash or virus attack, the Maxtor SafetyDrill feature automatically creates a snapshot of the entire contents of your PC's hard drive which can be readily booted for an easy and complete recovery.

- IEEE 1394 FireWire, Hi-Speed USB Connectivity
- MacOS X 10.4.7 or later, Windows Vista / XP
- Mains AC Power
- Backup software included

320GB (MXT4025) **$123**
1TB (MXT4100) **$299**



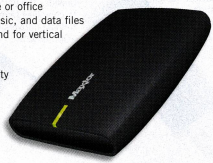
SAVE $3 off RRP
WebCode: MXT4105 **$166**

axtor Personal Storage Basics 320GB

tantly expand your storage.

y add-on storage for home or office. Instantly expand your storage to
d digital photos,music, and data files. It's simple to install--just plug
external drive into an available USB 2.0/1.1 port on your PC.
asy add-on storage for home or office
erfect for digital photos, music, and data files
ompact design includes stand for vertical
rientation
asy installation
SB 2.0 and 1.1 compatibility
p to 320GB capacities

0GB (MXT3005) **$86**
0GB (MXT3006) **$154**



SAVE $14 off RRP
WebCode: MXT3007 **$185**

Seagate 160GB FreeAgent Go

Now any PC can temporarily become your PC

Whether using a computer at work, school, a business center, an Internet cafe or library, have your desktop environment and latest files with you. Along with up to 250 glorious gigabytes, FreeAgent Go software lets you carry lots of great programs and all your browser favorites and passwords without having to haul around your computer.

FREE Carry Bag



WebCode: CCG8010 **$119**

/D My Passport Essential 20GB Portable Drive (Red)

ke your data with you

ry thousands of songs, videos or photos on
D's My Passport Essential Portable. Comes
h encryption software.

0GB Blue
DD0151) **$179**
0GB Black
DD0148) **$179**



SAVE $20 off RRP
WebCode: WDD0154 **$179**

WD Elements 1TB USB Desktop Drive

Plain, simple, reliable add-on storage

WD Elements external hard drive is preformatted for immediate use. Simply plug it in to a USB port and you've got instant storage your PC or Macintosh. The compact metal case provides extra data protection.

320GB (WDD0164) **$96**
640GB (WDD0165) **$146**



WebCode: WDD0166 **$199**

Tower 7 Port USB 2.0 Hub

Vertical stand included

Running out of USB Ports? Plug this USB Hub into your PC or notebook to increase your capacity.

- Supports both bus and self-powered
- Over-current detection and protection for each down-stream port
- Support O/S: Windows 98SE/ME/2000/XP Vista, MAC OS 8.6 & above



SAVE $39 off RRP
WebCode: SIG0007
$19.95

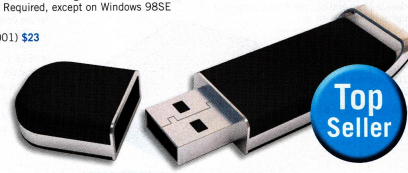
Tango USB Flash Drive 8GB

Neat & tidy, ready for business

Bold and sturdy design, this USB flash drive is ideal for anyone in need of small portable storage solution.

- Designed to utilise the high bandwidth of USB 2.0 interface
- No Driver Required, except on Windows 98SE
- Bootable

4GB (SIG0001) **$23**



SAVE $44 off RRP
WebCode: SIG0006
$35

Verbatim Storage Media

CD-RW		
CD-RW 2x-4x 5Pk Slim Case	VBM3133	$5
CD-RW 4x 25 Spindle	VBM5169	$24
DVD-R/+R (16x)		
DVD-R 10 Spindle	VBM9510	$6
DVD-R 25 Spindle	VBM0580	$16
DVD-R 50 Spindle	VBM5101	$35
DVD-R 50 Spindle Inkjet Print	VBM1973	$35
DVD-R 100 Spindle	VBM6049	$64
DVD-R 100 Spindle Inkjet Print	VBM5153	$56
DVD+R 10 Spindle	VBM5032	$8
DVD+R 25 Spindle	VBM5033	$14
DVD+R 50 Spindle	VBM5037	$31
DVD+R 50 Spindle Inkjet Print	VBM1974	$32
DVD+R 100 Spindle	VBM6050	$54
DVD+R 100 Spindle Inkjet Print	VBM1995	$64
DVD-RW/+RW (4x)		
DVD-RW 10 Spindle	VBM6053	$16
DVD+RW 10 Spindle	VBM6044	$18
DVD-R/+R Dual Layer (2.4x)		
DVD+R DL 8.5Gb 1Pk J/Case	VBM4912	$5
DVD+R DL 8.5Gb 3Pk J/Case	VBM5014	$14
DVD+R DL 8.5Gb 20 Spindle	VBM4981	$60
Blu-ray		
BD-R 2x 25GB 5Pk J/Case	VBM4361	$142
BD-R 2x 25GB 10Pk J/Case	VBM6068	$224



SanDisk Cruzer Micro U3 8GB

The market leading flash drive

The Cruzer Micro design is a small, smart and secure USB Flash Drive.

- Small, compact light weight design
- New retractable USB slider eliminates the need for caps
- U3 smart enables you to take your portable applications on the go

2GB (SAN0061) **$13**
4GB (SAN0062) **$22**
16GB (SAN0064) **$74**



WebCode: SAN0103
$35

Belkin F3U150 - USB 2.0 File Transfer Cable

Quick & easy transfers

The Belkin USB 2.0 File Transfer Cable provides the perfect solution that allows you to copy files from PC to PC without the need to install drivers when used with Windows ME, 2000 or XP.



WebCode: BEL1150
$39.95

SanDisk Extreme Ducati USB 4GB

Passion for Performance

One look at the SanDisk Extreme Ducati Edition USB Flash Drive, and you know something's different.

- Distinctive design inspired by Ducati motorcycles.
- Fast 20MB/sec sequential read/write speed.
- The fastest consumer USB Flash Drive by SanDisk



WebCode: SAN0104
$65

SanDisk Cruzer Titanium USB Flash Drive - 8GB

Extremely rugged & smart

Cruzer Titanium is an extremely rugged and smart USB flash drive. It is built with Liquidmetal casing that is crush-resistant to over 2,000 lbs. Cruzer Titanium also includes U3 smart technology. Co-Invented by SanDisk, U3 technology gives you the ability to carry your files AND your software on a secure USB drive.

4GB (SAN0086) **$35**



WebCode: SAN0127
$53

NETGEAR ReadyNAS
A New Class of Network Attached Storage

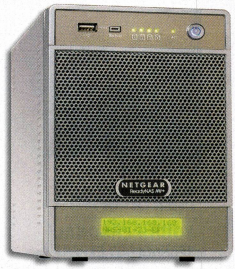
ETGEAR ReadyNAS is the perfect storage solution whether it be for your home, nall business or large workforce. These storage devices are packed with robust gh-end server features including Gigabit Ethernet, hardware RAID, system onitoring capabilities and built-in backup.

ith an easy web browser interface and setup wizard, ReadyNAS can be configured th minimal effort - saving you valuable time.



NETGEAR

ETGEAR ReadyNAS NV+ 4-Bay Gigabit Desktop Network torage (No HDD)



adyNAS NV+ was designed specifically for home offices, small businesses and workgroups. ver before has there been available a cost-conscience Network Attached Storage (NAS) pliance packed with robust high-end server features, including Gigabit Ethernet, hardware ID, system monitoring capabilities and built-in backup. ReadyNAS couples out of the box ployment and easy management with robust file serving and data redundancy.

- Easy Deployment and Management
- RAID
- X-RAID Technology
- Backup
- File Serving and Media Streaming
- Advanced System Design

AVE $316 off RRP **$1383**
ebCode: NTG8011

2x500GB HDD Version (NTG7998) **$1455**
4x500GB HDD Version (NTG7999) **$2133**
2x750GB HDD Version (NTG8031) **$2163**

ETGEAR ReadyNAS Duo 1TB



e ReadyNAS Duo is perfect for homes with more than one computer. Unlike a USB drive, e ReadyNAS connects to the network and is simultaneously accessible via all connected ndows or Macintosh computers.

- Extra storage that can be shared with all your computers
- Access stored content anywhere via the Internet
- Vacant drive bay for adding an additional hard drive to duplicate your data
- Supports most network music, picture and video players
- Embedded BitTorrent client for direct downloading from the Internet – No PC Required

0GB (NTG8133) **$570**
0GB (NTG8134) **$713**

AVE $203 off RRP **$956**
ebCode: NTG8135

LINKSYS® by Cisco

Linksys EasyLink Advisor (LELA)

New to setting up a wireless network? LELA is a free software included with the New Design Linksys Routers. Easy to install and effortless to use - Wireless-N with LELA lets you stay connected wirelessly, giving you the freedom to do whatever you need to do.

- Get up and running in minutes
- Optimise network performance
- Keep an eye on your network Cut the Cord.

Go wireless with Linksys !



LELA
LINKSYS EASYLINK ADVISOR

YOUR PERSONAL TECHNOLOGY EXPERT

Linksys WMP300N Wireless-N PCI Adapter



SAVE $63 off RRP
WebCode: LNK5545
$86

Linksys WPC300N Wireless-N Notebook Adapter



SAVE $63 off RRP
WebCode: LNK5546
$86

Linksys WUSB600N Dual-Band Wireless-N USB Network Adapter



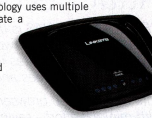
SAVE $37 off RRP
WebCode: LNK6290
$112

Linksys WRT160N Ultra RangePlus Wireless-N Router

Excellent range, Excellent price

Internet-sharing Router and 4-port Switch, with a built in speed and range enhanced Wireless Access Point

- MIMO technology uses multiple radios to create a robust signal that travels farther and reduces dead spots



SAVE $38 off RRP
WebCode: LNK6284
$131

Linksys WRT54G2 Wireless G Broadband Router

4 Port Wireless Router

With the Linksys Wireless-G Broadband Router at the center of your home or office network, you can share a high-speed Internet connection, files, printers, and multi-player games with flexibility, speed, security and simplicity.



SAVE $20 off RRP
WebCode: LNK6287
$69

Linksys WAG160N Wireless N ADSL2+ Gateway

All-in-one Internet solution

- High-speed ADSL2+ Modem gives you a fas "Always On" connection to the Internet
- Connect your PCs via the built-in Router an 4-port Switch to jump start your Ethernet network and share the Internet throughout the building
- Built-in Wireless-N (draft 802.11n) Access Point also lets you connect without running wires



SAVE $44 off RRP
WebCode: LNK6285
$155

Astaro Security Gateway

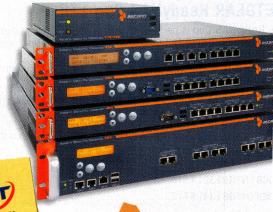
Simple to implement & stay secure

Astaro Security Gateway integrates complete Network, Web and Mail Security through an intuitive browser-based user interface.

The Astaro Security Gateway appliance is the most easy-to-use and cost-effective "all-in-one" solution available, working to effectively shield businesses from internet based threats everyday. With offerings for SMB and corporate business, each solution offers you comprehensive perimeter security for:

- Network Security - Firewall, VPN and Intrusion Prevention
- Web Security - URL Filtering, Malware Detection, Bandwidth Management and IM/P2P Control
- Mail Security – Anti-spam, Anti-virus, Anti-phishing and Email Encryption Deployment as hardware, software or virtual appliance

10 User Appliance: from $995
50 User Appliance: from $1,700



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1300 761 761

astaro
internet secur

ProCurve Networking by HP

Imagine a World Without Choice



ProCurve Lifetime Warranty



Procurve 2824 / 24-port 10/100/1000

Our Price **$3,088.00** | Save $446.00

WebCode.....HPE4903

ProCurve Switch 2800 Series

The ProCurve Switch 2800 series consists of two switches: the 24-port ProCurve Switch 2824 with 20 10/100/1000 ports, and the 48-port ProCurve Switch 2848 with 44 10/100/1000 ports. In addition, each switch has 4 dual-personality ports for RJ-45 10/100/1000 or mini-GBIC fiber 1000 connectivity. Ideal for medium to large networks, the ProCurve 2824 and ProCurve 2848 cost-effectively offer the maximum bandwidth performance with up to 10 times the speed of 100 Mbit switches.

Procurve 2848 /48 port 10/100/1000 (HPE4904) **$6053.00**

ProCurve Switch 2510 Series

The ProCurve Switch 2510 series consists of managed, Layer 2, 10/100 switches with Gigabit uplinks. The 2510-24 has 24 10/100 ports and 2 Gigabit dual-personality ports for 10/100/1000 or mini-GBIC connectivity. The 2510-48 has 48 10/100 ports and 4 Gigabit ports (2 10/100/1000 ports and 2 open mini-GBIC slots), all of which can operate simultaneously. The 2510-24 is fanless, ensuring quiet operation and making it ideal for deployment in open spaces.

Procurve 2510-48 /48 port 10/100/1000 (HPE4957) **$796**

ProCurve Lifetime Warranty



Procurve 2510-24 / 24-port 10/100/1000

Our Price **$522.00** | Save $75.00

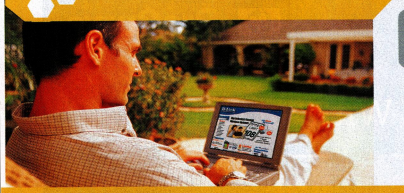
WebCode.....HPE4956

For as long as you own the product,with next-business-day advance replacement (available in most countries). The following hardware products and their related family modules have a one-year warranty with extensions available: The ProCurve Routing Switch 9300m Series,ProCurve Switch 8100fl Series,ProCurve Access Control Server 745wl and the ProCurve Network Access Controller 800. Stand-alone software may have a different warranty duration. For details,refer to the ProCurve Software License,Warranty and Supportbooklet at: http://www.hp.com/rnd/support/warranty/index.htm

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CSW-IT



Works with Windows Vista™

Wireless G is great if you use you connection to surf the web and check your email, and don't want t spend more than you need to.

D-Lifestyle

Ph: 1300 658 600 - citysoftware.com.au

D-Link RangeBooster N USB Adapter DWA-140



$97 | SAVE $22 off RRP | WebCode: DLK0190

D-Link RangeBooster N 650 Desktop Adapter DWA-547



$97 | SAVE $22 off RRP | WebCode: DLK1005

D-Link Xtreme N PCI Express Desktop Adapter DWA-556



$99 | SAVE $60 off RRP | WebCode: DLK0091

D-Link Xtreme N Notebook ExpressCard DWA-643



$99 | SAVE $60 off RRP | WebCode: DLK0092

D-Link DSL-2740B RangeBooster N ADSL2+ Modem Router

The DSL-2740B RangeBooster N ADSL/ADSL2/2+ Modem Router is a versatile, high-performance remote router for the home and small office. With integrated ADSL2/2+ supporting up to 24Mbps download speeds, firewall protection, Duality of Service (QoS), 802.11n wireless LAN (draft 1.0) and 4 Ethernet switch ports.



$244 | SAVE $55 off RRP | WebCode: DLK0085

D-Link DSM-330 DivX HD Media Playe

Add the DSM-330 to your wired or wireless home network and access media on your TV/Entertainment system from all your PCs, hard drives and online. Get music, photos and video using 802.11b/g or Ethernet connections and enjoy the high quality media experience in your home theatre.

We rate this product!

- HDMI Connectivity
- Wireless 802.11b/g
- DivX Connected



NEW

$329 | SAVE $70 off RRP | WebCode: DLK3300

D-Link DIR-320 Wireless G Router with USB Print Server

Connect the Wireless G Router to a broadband modem to wirelessly share your high-speed Internet connection and enjoy surfing the web, checking e-mail, and chatting with family and friends online.

- USB printer sharing
- 802.11g wireless connection

DIR-300 - Wireless G Router
(DLK3006) $57



NEW

$83 | SAVE $16 off RRP | WebCode: DLK0320

D-Link DSC-920 Wireless G IP Security Camera

The D-Link Wireless G Internet Camera connects to an Ethernet or wireless network to enable remote high-quality video recording. 802.11g wireless technology allows you to place the DCS-920 in places that were previously inaccessible such as ceiling and walls.

- Remotely Monitor Your Home or Office
- Motion JPEG

DCS-910 - Ethernet Camera
(DLK5910) $124



NEW

$150 | SAVE $39 off RRP | WebCode: DLK5920

D-Link DNS-343 4 Bay Network Storage Enclosure

The D-Link DNS-343 4-Bay Network Storage Enclosure, when u with internal SATA drives, enables you to share files with every on the network. Back up all files inc. music, photos, and movies with RAID 0-5 'mirroring' technology.

- Add up to 4 SATA drives
- Built-in FTP server

1 Bay DNS-313
(DLK0313) $177

2 Bay DNS-323
(DLK0066) $327



NEW

$654 | SAVE $145 off RRP | WebCode: DLK3430

D-Link DPR-1260 Wireless 108G Multifunction Print Server

The D-Link RangeBooster G Multifunction Print Server is D-Link's most versatile and easiest to use Print Server yet.

- Share Up to 4 USB Printers, Multifunction Printers
- Ethernet & 802.11g Wireless
- Supports Scanning from Multifunction Printers
- Tested withover 100 Multifunction



$163 | SAVE $36 off RRP | WebCode: DLK1811

D-link DIR-451 3G Mobile Router

The 3G Mobile Router enables you to quickly create a secure wireless 802.11g network and provide access to the Internet using a cellular signal by inserting a PCMCIA, Express or USB 3G Card Operators Supported:

- Telstra
- Optus
- Hutchinson 3G
- Vodafone



NEW

*see www.dlink.com.au for compatibility

$199 | SAVE $40 off RRP | WebCode: DLK4570

D-Link DGS-1005D Green Ethernet Unmanaged 5-Port Gigabit Switch

The D-Link GigaExpress DGS-1005D is an energy efficient 5-por 10/100/1000Mbps Gigabit Switch that delivers power, performar and reliability in one cost-effective, space-saving design. Incre the speed of your network server and backbone connections, make Gigabit to the desktop a reality.

D-Link DGS-1008D - 8-Port
(DLK0667) $96



greenethernet

$64 | SAVE $15 off RRP | WebCode: DLK0666

ustek ScanExpress A3 USB 600 Pro Scanner

Flatbed Scanner

ideal solution for anyone setting up a home office, the Mustek ScanExpress A3 comes
nplete with high-resolution, color-accurate scanning abilities. With its 36-bit color
turing abilities, the ScanExpress A3 can capture over 68.7 billion colors in a
gle-pass. 600 x 1200 dpi resolution
Quick and easy USB interface
Multiple functions include Scan, Copy, E-Mail, Fax and OCR
Valuable Software Packages included
Unique Optional transparency adapter available
48-Bit Colour
CIS technology
Comprehensive OCR and image editing software
USB 2.0 connection
Supports Microsoft Windows 2000/XP/Vista and Mac OS X

stek BearPaw Plus A4 Scanner (MUS0100) **$98**



Unbeatable Value

AVE $100 off RRP
ebCode: MUS0101
$449

anon LiDE 25 A4 Scanner

ordable, quality scanning made easy

200 x 2400 dpi optical resolution with
8-bit colour depth for sharp, accurate scans.
Three one-touch buttons Scan/Copy/E-mail
or easy operation.
Compact and stylish design.
USB powered.
Advanced Z-Lid accommodates scanning of
ulky items such as books with ease.



AVE $11 off RRP
ebCode: CAN0403
$108

Canon CanoScan 8800F Scanner

The easy to use, high speed scanner with versatile features.

Sleek and fast, this powerful scanner will impress you the very first time you push power. With high-luminance white LED lamps - it's ready to scan immediately, with no warm-up time needed. You'll quickly produce spectacular results, with max. color dpi resolution of 4800 x 9600. Seven easy buttons automate the scanning process, so it's simple to scan, copy and create e-mails and multi-page PDFs. Built-in FARE 3.0 retouching technology helps to enhance your final images. And to save time, you can batch-scan up to twelve 35mm frames or up to four slides - either positives or negatives.



SAVE $32 off RRP
WebCode: CAN5015
$317

pson Perfection V200
4 Photo Scanner

ntains a Matrix CCD sensor

e Epson Perfection V200 Photo is a versatile
nner suitable for a wide range of applications
luding scanning photos, documents, thick
ects and 35mm strip film and slide scanning.
turing Epson's superior
trix CCD Micro
ns, 4800 x 9600
ical dpi and fast
nning speeds
as little as
seconds.



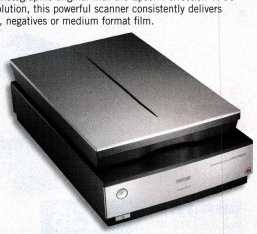
AVE $19 off RRP
ebCode: EPS0200
$230

Epson Perfection V700 Photo A4 Scanner

Scan paper, slides & film

Get professional quality results from virtually any photographic original with the Epson Perfection V700 Photo scanner. With groundbreaking 6400 dpi resolution, this powerful scanner consistently delivers precision color and detail, whether scanning slides, negatives or medium format film.

- Resolution: Dual Lens Systems– 6400x9600dpi film, 4800x9600dpi reflective scanning Monochrome(Bi-Level)Draft mode A4 300dpi
- 35mm POSITIVE FILM - 2400dpi 47 sec
- USB 2.0 / IEEE1394 (FireWire)



SAVE $12 off RRP
WebCode: EPS0700
$837

Lexmark X2650 3-In-1 Multifunction

Great speed and performance

Print, Scan, Copy at outstanding quality and bundled with great software all at a stunning price. Lexmark Imaging Studio Software makes it easy to crop, rotate and resize photos, plus colour fix and red eye reduction. Optical Character Recognition (OCR) software allows you to easily scan hard copy text documents into a soft copy format

- 22ppm Mono
- 16ppm Colour
- 4800x1200 DPI Printing
- 600x1200dpi Scanning
- USB
- On-site warranty



SAVE $39 off RRP
WebCode: LEX2657
You Pay $49.95 $29.95 After $20 Cashback
*See citysoftware.com.au/promotions

Lexmark X5070 4-in-1 Multifunction

Autofeeding inkjet fax

Ideal for offices, the X5070 offers a fax and a photo quality printer wit sacrificing the fax handset and auto feeding that most company's need With other features such as PictBridge and borderless 4x6 Photos it is the ideal solution for any business.

- 24ppm Mono
- 17ppm Colour
- 4800x1200 DPI Printing
- 600x1200dpi Scanning
- USB
- On-site warranty



SAVE $59 off RRP
WebCode: LEX5070
You Pay $110 $90 After $20 Cashback
*See citysoftware.com.au/promoti

BONUS

Valued at $140



Logitech Harmony Remote & Colour Ink cartridge

Lexmark X4850 / Lexmark X6570 / Lexmark X9575

Lexmark X4850 3-In-1 Multifunction

Provide maximum performance for your home

The Lexmark X4850 Wireless All-in-One offers the convenience of wireless technology combined all the features you can expect from a quality inkjet, 2.4" screen, PictBridge this multifunction has it all. Produce high resolution scan documents and easily copy with 1-touch of a button.

- 30ppm Mono
- 27ppm Colour
- 4800x1200 DPI Printing
- 600x1200dpi Scanning
- USB, 802.11b/g Wireless
- On-site warranty

***BONUS Remote & Colour Ink Cartridge**



SAVE $64 off RRP
WebCode: LEX4850
$135
*See citysoftware.com.au/promo

Lexmark X9575 4-In-1 Multifunction

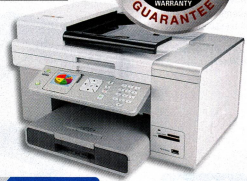
Share your Multifunction via wireless

This Wireless All-in-One with Fax offers the convenience of wireless technology combined with two-sided printing

- 33ppm Mono
- 28ppm Colour
- 4800x1200 DPI Printing
- 1200x4800DPI Scanning
- USB, 802.11 b/g, Ethernet



***BONUS Remote & Colour Ink Cartridge**



SAVE $113 off RRP
WebCode: LEX9575
$236
*See citysoftware.com.au/promotions

Lexmark X6570 4-in-1

Wireless Home Office Productivity

Automatic duplexing, a 25-sheet automatic document feeder, and integrated 802.11b/g networking. These features can make a big difference for the SOHO/small business crowd.

- 28ppm Mono
- 24ppm Colour
- 4800x2400 DPI Printing
- 600x1200 DPI Scanning
- USB, 802.11 b/g
- On-site warranty

***BONUS Remote & Colour Ink Cartridge**



SAVE $104 off RRP
WebCode: LEX6570
$175
*See citysoftware.com.au/pron

KONICA MINOLTA



clusive to
y Software

5 ppm A4 COLOR | 20 ppm A4 B&W | A4 | NETWORK

Konica Minolta magicolor 2550DN
A4 Colour Laser

- 20ppm Mono
- 5ppm Colour
- PhotoART 9600 x 600 dpi
- PostScript 3, PCL5, PCL6
- Parallel, USB 2.0, Ethernet
- 4,500 Page Black Toner,
- 4,500 Page CMY Toner

DUPLEX READY

1 Year On-Site Warranty (Next Day Service)

SAVE $362 off RRP
WebCode: QMS2551
$636

300 658 600 **citysoftware.com.au**

5 ppm A4 COLOR | 20 ppm A4 B&W | A4 | NETWORK

Konica Minolta magicolor 4650EN
A4 Network Colour Laser

- 24ppm Mono and Colour
- PhotoART 9600 x 600 dpi
- PostScript 3, PCL 6 & more
- Parallel, USB 2.0, Gigabit Ethernet
- 250 sheet paper tray & 100 sheet multi-purpose tray
- 3,000 page starter toners included

1 Year On-Site Warranty (Next Day Service)



FREE set of 8,000 page toners

SAVE $205 off RRP
WebCode: QMS4650
$1194

5 ppm A4 COLOR | 20 ppm A4 B&W | A4 | PRINTS SCANS COPIES FAX | NETWORK | SCAN COPY FAX

Konica Minolta magicolor 2590MF
A4 Network Colour Laser MFP

- 20ppm Printing and Copying
- 2400 x 600 dpi
- HD toner quality
- USB 2.0, Gigabit Ethernet
- 200 Sheet Paper Tray
- 4,500 black toner and 1,500 colour toners included

1 Year On-Site Warranty (Next Day Service)



FREE set of extra toners (4,500 K & 1,500 CMY)

SAVE $205 off RRP
WebCode: QMS2590
$1194

19 ppm A4 B&W | A3 | NETWORK

Konica Minolta PagePro™ 9100
A3 Workgroup Mono Laser

- 35ppm A4 and 19ppm A3
- 1200 x 1200 dpi
- PostScript 3, PCL 6 & more
- Parallel, USB 2.0, Gigabit Ethernet
- 500 Sheet paper tray and 200 sheet multi-purpose tray
- 6,000 Page Black Toner included

1 Year On-Site Warranty (Next Day Service)



SAVE $301 off RRP
WebCode: QMS6158
$698

Minimise your environmental impact with HP LaserJet Printers

HP has launched another initiative to help you minimise your environmental footprint. A customer who buys any HP LaserJet before 30 October 08 can claim a bonus offset carbon credit. This is representative of carbon emissions produced over the lifetime^ of the HP LaserJet printer being offset by HP through the purchase of carbon credits. HP is partnering with Climate Positive to source carbon credits, including Australian renewable energy projects, that helps to reduce greenhouse gas emissions. For more information visit www.citysoftware.com.au/promotions

^CO2 calculation is based on avg. energy consumption of printer (supplies & media excluded) as defined by the ENERGY STAR Program Requirements for Imaging Equipment, Version 1.0 Typical Electricity Consumption (TEC) over 5yr lifetime.



HP Color LaserJet CP4005dn Laser Printer

Combine robust performance, power packed durability & superb color quality for the printing needs of all sizes of workteams

- 30ppm Mono
- 25ppm Colour
- 600x600DPI
- PCL 5C/6, PostScript 3, PDF 1.4
- USB, Ethernet

Black Toner (HPL0400) **$206**
Cyan Toner (HPL0401) **$306**
Magenta Toner (HPL0403) **$306**
Yellow Toner (HPL0402) **$306**

*Trade in your old printer for up to $150 cashback



* See citysoftware.com.au /promotions

SAVE $456 off RRP WebCode: HPL0504 **$2294**

HP LaserJet P2015 Mono Laser

UPGRADE for only $882

Produce professional-quality documents at true 1200 dpi

- 26ppm Mono
- 1200x1200 DPI
- PCL 5E, PostScript 3, PCL 6
- USB

Black Toner (HPL7553) **$103**



*Trade in your old printer for up to $45 cashback

* See citysoftware.com.au /promotions

SAVE $51 off RRP WebCode: HPL0366 **$538**

HP LaserJet P3005n Mono Laser

High quality printer that's fast

- 33ppm Mono
- 1200x1200DPI
- PCL 5E, PostScript 3, PCL 6
- USB, Ethernet

Black Toner (HPL7551) **$165**



*Trade in your old printer for up to $100 cash

* See citysoftware.com.au /promotions

SAVE $129 off RRP WebCode: HPL7814 **$1420**

HP LaserJet M1522nf Mono Multifunction

UPGRADE for only $459

Print, Scan, Copy, Fax

- 23ppm Mono
- 600x600DPI Printing
- 1200x1200DPI Scanning
- PCL 5e, PCL 6, PostScript 3
- USB, Ethernet

Black Toner (HPL0436) **$97**



SAVE $121 off RRP WebCode: HPL0534 **$647**

HP LaserJet M2727nfs Mono Multifunction

Don't waste time waiting for your documer

- 26ppm Mono
- 1200x1200DPI Printing
- 1200x1200DPI Scanning
- PCL 5e/6, PostScript 3
- USB, Ethernet

Black Toner (HPL7553) **$103**



*Trade your printer for $75 cash

* See citysoftware.com.au /promotions

SAVE $93 off RRP WebCode: HPL0533 **$1106**

FUJI xerox

300 658 600

itysoftware.com.au



Budget colour laser

ji Xerox DocuPrint C1110 A4 Colour Laser

DocuPrint C1110 is a small but powerful A4 Laser Printer that is ilable in networked and non-networked configurations. With it's easy to functionality and innovative design it has a small footprint with a big tude that keeps the costs down. This little gem will suit the SoHo or SMB rket's.

- 16ppm Mono
- 12ppm Colour
- Up to 9600 x 600 DPi
- USB, Ethernet
- 40,000 Duty Cycle



$200* Cashback Ends Sept 30

SAVE $230 off RRP
WebCode: FXP1111

You Pay $479
$279
After $200 Cashback

Affordable colour laser

Fuji Xerox DocuPrint C2100 A4 Colour Laser

The DocuPrint C2100 redefines color network printing and is the ideal choice for workgroups that require a high quality printer at a low total cost of ownership.

- 25ppm Mono
- 17ppm Colour
- Up to 9600 x 600 DPI
- 60,000 Duty Cycle
- Parallel, USB, Ethernet

Black Toner 8k (FXP2106) **$233**
Black Toner 3k (FXP2110) **$124**



BONUS Duplexer!

SAVE $146 off RRP
WebCode: FXP2100

$679

Copier / Printer / Scanner

ji Xerox WorkCentre 3119 4 Mono Multifunction Laser

- 18ppm Mono
- 600 x 600 DPI
- USB
- 10,000 Duty Cycle
- Memory 32MB



SAVE $46 off RRP
WebCode: FXP0235

$229

Robust business laser

Fuji Xerox Phaser 3428DN A4 Mono Laser

- 28ppm Mono
- Up to 1200 x 1200 DPI
- Parallel, USB, Ethernet
- 65,000 Duty Cycle
- Memory 32MB



SAVE $120 off RRP
WebCode: FXP3429

$628

Perfect for business professionals

Fuji Xerox DocuPrint C3210DX A4 Colour Laser

- 30ppm Mono
- 25ppm Colour
- Up to 1200 x 1200 DPI
- Parallel, USB, Ethernet
- 80,000 Duty Cycle



SAVE $211 off RRP
WebCode: FXP3211

$1107

For all your office needs

ji Xerox DocuPrint C2090FS olour Multifunction Laser

- 20ppm Mono
- 5ppm Colour
- 600 x 600 DPI
- USB, Ethernet
- Fax / Print
- Scan / Copy



*$200 Cashback Ends Sept 30

SAVE $182 off RRP
WebCode: FXP2090

You Pay $1098
$899
After $200 Cashback

Huge duty cycle

Fuji Xerox DocuPrint 340A A4 Mono Laser

- 34ppm Mono
- Up to 1200 x 1200 DPI
- 150,000 Duty Cycle
- Parallel, Serial, USB, Ethernet



SAVE $169 off RRP
WebCode: FXP0346

$1198

Solid ink technology

Fuji Xerox Phaser 8560DN A4 Colour Laser

- 30ppm Colour
- 600 x 600 DPI
- 85,000 Duty Cycle
- Parallel, Serial, USB, Ethernet



HUGE Monthly Duty Cycle

SAVE $440 off RRP
WebCode: FXP0562

$1790

INKS CARTRIDGES

Description		Webcode	Price
HP 78	Tri-Colour	HPD6578	$45
HP 23	Tri-Colour	HPI1826	$50
HP 45	Black	HPD095	$41
HP 15	Black	HPD6645	$38
HP 28	Tri-Colour	HPI8782	$29
HP 27	Black	HPD8772	$25
HP 56	Black	HPD6656	$27
HP 57	Tri-Colour	HPI6657	$45

TONER CARTRIDGES

Description		Webcode	Price
C3906A	Black Toner	HP741	$87
C4092A	Black Toner	HPL4092	$76
C4096A	Black Toner	HPL4096	$128
C4127X	Black Toner	HPL4129	$163
C4129X	Black Toner	HPL4131	$209
C7115A	Black Toner	HPL7115	$79
C7115X	Black Toner	HPL7117	$98
C8061X	Black Toner	HPL8063	$163
C9720A	Black Toner	HPL9720	$197
C9721A	Cyan Toner	HPL9721	$267
C9723A	Magenta Toner	HPL9723	$267
Q1338A	Black Toner	HPL1338	$195
Q2610A	Black Toner	HPL2610	$153
Q2612A	Black Toner	HPL2612	$89
Q2613A	Black Toner	HPL2613	$91
Q2613X	Black Toner	HPL2614	$114
Q2670A	Black Toner	HPL2670	$168
Q2683A	Magenta Toner	HPL2683	$217
Q3960A	Black Toner	HPL3960	$106
Q3961A	Cyan Toner	HPL3978	$127
Q3962A	Yellow Toner	HPL3979	$127
Q3963A	Magenta Toner	HPL3981	$127
Q3972A	Yellow Toner	HPL3976	$94
Q3973A	Magenta Toner	HPL3977	$94
Q5942A	Black Toner	HPL5942	$190
Q5942X	Black Toner	HPL5943	$287
Q5945A	Black Toner	HPL5945	$259
Q5949A	Black Toner	HPL5949	$91
Q5949X	Black Toner	HPL5994	$167
Q5950A	Black Toner	HPL5950	$226
Q5951A	Cyan Toner	HPL5951	$321
Q5952A	Yellow Toner	HPL5952	$349
Q5953A	Magenta Toner	HPL5953	$321
Q6000A	Black Toner	HPL6060	$97
Q6001A	Cyan Toner	HPL6061	$106
Q6002A	Yellow Toner	HPL6062	$106
Q6003A	Magenta Toner	HPL6063	$106
Q6470A	Black Toner	HPL6470	$168
Q6511A	Black Toner	HPL6511	$158

WHY BUY HP ORIGINAL SUPPLIES

SAVE MONEY AND HELP PROTECT THE ENVIRONMENT

If you are eager to save money and the environment, you can avoid excess costs, spoilage and waste with high quality, reliable HP original supplies.

Opportunity for rewards and benefits

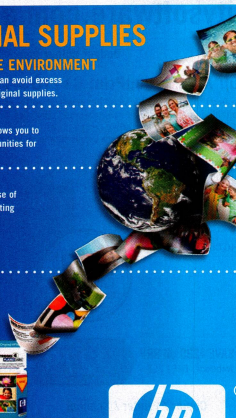
- Look for HP specially marked pink packaging which allows you to participate in our rewards program and provides opportunities for prizes and bonuses too!

Quality means less waste

- 70% of the environmental impact is during the use phase of printing so the greatest benefit comes from reliable printing
- Studies show 1 in 4 remanufactured or refilled print cartridges are dead on arrival or fail prematurely
- Reliable hp original supplies cause less spoilage of paper and waste cartridges

Environmental from start to finish

- HP's Design for environment program was established in 1992, which means that over 15 years of research, development and environmentally-conscious design practices have gone into HP original printing supplies
- HP's environmental programs cover the full lifecycle of printing supplies, not just the ultimate disposal



WHAT DO YOU HAVE TO SAY?

Purchase
5 specially marked HP Toner Cartridges
(Pink Packaging)

Receive
A Tom Tom One V3 Navigator Valued at **$299 OR $150** cashback



Purchase
10 specially marked HP Toner Cartridges
(Pink Packaging)

Receive
Toshiba TDP SP1 AV Projector Valued at **$799 OR $500** cashback



Extended BONUS Offer!

*Hurry, offer valid from 1st September – 31st October 2008 only!**

Tak advantag of thi grea offe

Purchase
Any 3 specially marked HP Ink Cartridges

Receive
SanDisk Sansa Clip 4GB MP3 Player valued at $129



Add extra VALUE to your HP purchase!

*Hurry, offer valid from 1st September – 31st October 2008 only!**

Create a tun all your ow with thi BONUS offe

Look for the pink banner on the packaging as pictured.

rinter Consumables

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INKS CARTRIDGES

anon

code	Vendor	Colour	Price
BEBK	BCI-3EBK	Black	$18
BEC	BCI-3EC	Cyan	$15
BEM	BCI-3EM	Magenta	$15
BEY	BCI-3EY	Yellow	$15
0048	BCI-6BK	Black	$21
0049	BCI-6PC	Ph.Cyan	$21
0050	BCI-6C	Cyan	$21
0051	BCI-6M	Magenta	$21
0052	BCI-6PM	Ph.Magenta	$21
0053	BCI-6Y	Yellow	$21
0283	BCI-6R	Red	$19
0284	BCI-6G	Green	$19
0429	CLI 8BK	Black	$23
0430	CLI 8C	Cyan	$23
0431	CLI 8M	Magenta	$23
0432	CLI 8PC	Ph.Cyan	$23
0433	CLI 8PM	Ph.Magenta	$23
0434	CLI 8Y	Yellow	$23
0437	PGI 5BK	Black	$23

XMARK

0307	15M2619A	Colour	$33
105	12A1970	Black	$42
5101	15M0120	Colour	$50
5107	10N0016	Black	$39

EPSON

Webcode	Vendor	Colour	Price
LEX7001	12A1975	Black	$51
EPA0060	T028	Black	$46
EPA0061	T029	Colour	$40
EPA0890	T0491	Black	$19
EPA0511	T0492	Cyan	$19
EPA0512	T0493	Magenta	$19
EPA0513	T0494	Yellow	$19
EPA0514	T0495	Ph.Cyan	$19
EPA0515	T0496	Ph.Magenta	$19
EPA0631	T0631	Black	$15
EPA0632	T0632	Cyan	$14
EPA0633	T0633	Magenta	$14
EPA0634	T0634	Yellow	$14
EPA0700	T5591	Black	$19
EPA0702	T5592	Cyan	$19
EPA0703	T5593	Magenta	$19
EPA0704	T5594	Yellow	$19
EPA0705	T5595	Ph.Cyan	$19
EPA0706	T5596	Ph.Magenta	$19
EPA0810	T026	Black	$38
EPA0811	T027	Colour	$31
EPA0816	T0548	Black	$20
EPA0817	T0541	Ph.Black	$20
EPA0818	T0542	Cyan	$20
EPA0819	T0543	Magenta	$20

Webcode	Vendor	Colour	Price
EPA0821	T0544	Yellow	$20
EPA0822	T0547	Red	$20
EPA0823	T0549	Blue	$20
EPA1040	T038	Black	$18
EPA1270	T009	Colour	$40
EPA1271	T007	Black	$30
EPA1305	T0501	Black	$29
EPA2100	T0341	Ph.Black	$19
EPA2103	T0342	Cyan	$19
EPA2104	T0343	Magenta	$19
EPA2106	T0345	Ph.Cyan	$19
EPA2107	T0346	Ph.Magenta	$19
EPA2403	T0594	Yellow	$21
EPA2404	T0595	Ph.Cyan	$21
EPA2405	T0596	Ph.Magenta	$21
EPA7320	T0731	Black	$15
EPA8121	T0812	Cyan	$27
EPA8122	T0813	Magenta	$27
EPA8123	T0814	Yellow	$27
EPA8124	T0815	Ph.Cyan	$27
EPA8125	T0816	Ph.Magenta	$27
EPA8126	T0821	Black	$19
EPA8127	T0822	Cyan	$19
EPA8128	T0823	Magenta	$19
EPA8129	T0824	Yellow	$19

TONER CARTRIDGES

SON

code	Vendor	Colour	Yield	Price
1104	0190	Black	4,000	$105
1105	0187	Yellow	4,000	$167
1106	0188	Magenta	4,000	$167
1107	0189	Cyan	4,000	$167

xerox

0230	CWAA0645	Drum	20,000	$182
0271	CWAA0713	Black	3,000	$104
0532	CT200652	Yellow	4,000	$192
0534	CT200650	Cyan	4,000	$192
0535	CT200649	Black	4,000	$110
0573	108R00727	Black	6,800	$104
0683	CWAA0683	Black	3,000	$98
1114	CT201114	Black	2,000	$89
1115	CT201115	Cyan	2,000	$129
1116	CT201116	Magenta	2,000	$129
1117	CT201117	Yellow	2,000	$129
2093	CT200922	Yellow	1,500	$130
2094	CT200921	Magenta	1,500	$130
2095	CT200920	Cyan	1,500	$130
2106	CT350485	Black	8,000	$233
2107	CT350486	Cyan	6,000	$248
2108	CT350487	Magenta	6,000	$248
2109	CT350488	Yellow	6,000	$248
2110	CT350481	Black	3,000	$124

Webcode	Vendor	Colour	Yield	Price
FXP2539	CT200658	Yellow	8,000	$338
FXP2540	CT200657	Yellow	8,000	$338
FXP2542	CT200655	Black	9,000	$105
FXP2547	CT200656	Cyan	8,000	$338
FXP3063	CT200805	Black	6,500	$85
FXP3064	CT200806	Cyan	6,500	$278
FXP3065	CT200807	Magenta	6,500	$278
FXP3066	CT200808	Yellow	6,500	$278
FXP3296	CT350567	Black	8,000	$196
FXP3297	CT350568	Cyan	6,000	$229
FXP3298	CT350569	Magenta	6,000	$229
FXP3299	CT350570	Yellow	6,000	$229
FXP3432	CWAA0716	Black	8,000	$209

LEXMARK

LEX1119	12N0772	Colour	28,000	$241
LEX1120	12N0773	Black	28,000	$72
LEX9020	X560H2KG	Black	10,000	$272
LEX1502	C500H2KG	Black	5,000	$175
LEX1503	C500H2CG	Cyan	3,000	$155
LEX1504	C500H2YG	Yellow	3,000	$155
LEX1505	C500H2MG	Magenta	3,000	$155
LEX1929	C9202KH	Black	15,000	$283
LEX2210	12017SR	Black	5,000	$85
LEX3123	10S0063	Black	2,000	$115
LEX4021	1382925	Black	17,600	$279
LEX6424	34217HR	Black	2,500	$96

Webcode	Vendor	Colour	Yield	Price
LEX6436	C5220KS	Black	4,000	$132
LEX9216	18S0090	Black	3,200	$89

KONICA MINOLTA

QMS1301	1710566-003	Black	3,000	$95
QMS1302	1710567-003	Black	6,000	$138
QMS2301	1710517-002	Yellow	1,500	$100
QMS2302	1710517-003	Magenta	1,500	$100
QMS2303	1710517-004	Cyan	1,500	$100
QMS2304	1710517-005	Black	4,500	$145
QMS2309	1710520-001	Drum	45,000	$199
QMS2401	1710590-001	Yellow	1,500	$94
QMS2402	1710590-002	Magenta	1,500	$94
QMS2403	1710590-003	Cyan	1,500	$94
QMS2404	1710590-004	Black	4,500	$138
QMS2405	1710590-005	Yellow	4,500	$206
QMS2406	1710590-006	Magenta	4,500	$206
QMS2407	1710590-007	Cyan	4,500	$206
QMS2408	1710591-001	Drum	45,000	$201
QMS5437	1710584-001	Waste	32,000	$56
QMS9110	1710497-001	Black	15,000	$259

SAMSUNG

SAM1703	ML-1710D3	Black	2,500	$108
SAM2554	ML-2550D5	Black	5,000	$132
SAM4151	SCX-D4200A	Black	3,000	$108
SAM4522	SCX-4521D3	Black	3,000	$108

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Microsoft Bluetooth Notebook Mouse 5000

- Transceiver-free and confident wireless connection to your Bluetooth PC.
- More responsive, more precise, and smoother tracking
- Battery light indicates when your battery is running low and an on/off switch helps you conserve power.



SAVE $15 off RRP WebCode: MST8245 **$54**

MICROSOFT PRICE CHECKER — Harris Technology $69.95 — Officeworks $59.95

Microsoft Digital Media Keyboard 3000

The Digital Media Keyboard 3000 is designed to fit the digital lifestyle, allowing users to bring digital media to life with one-touch access to photos, Windows Media Player, My Favorites Keys and Zoom. This sleek, thin keyboard is also optimized for Windows Vista, with quick access to the Flip 3D feature - all at an affordable price.



SAVE $8 off RRP WebCode: MST8485 **$41**

MICROSOFT PRICE CHECKER — JB Hi-Fi N/A — Officeworks $49.95

Microsoft Lifechat LX-2000

A full-size headset that folds down into a smal portable shape perfect for music, gaming onlir chatting & more

- The unique collapsible design allows the headset to fold into a compact shape for easy portability
- Behind-the-ear design is comfort & convenience
- Inline Volume & Mic Controls



SAVE $9 off RRP WebCode: MST8489 **$30**

MICROSOFT PRICE CHECKER — JUST RELEASED

Microsoft

Discover the Differen

Microsoft Hardv

Microsoft Office Home & Student 2007

Office Home and Student 2007 is the software suite that helps people easily create great looking documents, worksheets and presentations, as well as manage notes and information at home.

- Word 2007
- Excel 2007
- PowerPoint 2007
- OneNote 2007

3 User



BUY NOW $129 SEPTEMBER ONLY OCTOBER $196

SAVE $80 off RRP WebCode: MSA6101 **$129**

MICROSOFT PRICE CHECKER — Dick Smith $139 — Officeworks $144

Microsoft Office Small Business 2007 - Upgrade

Office Small Business 2007 is the complete, powerful and easy-to-use productivity and contact management suite. It will offer new tools to help employees at small businesses work more efficiently and effectively so they can deliver better customer service.

- Word 2007
- Excel 2007
- PowerPoint 2007
- Publisher 2007
- Outlook 2007 With Business Contact Manager



BUY NOW $269 SEPTEMBER ONLY OCTOBER $437

SAVE $180 off RRP WebCode: MSA6106 **$269**

MICROSOFT PRICE CHECKER — Harris Technology $299 — Dick Smith $299

Microsoft Office 2008 Mac Home & Student Edition 3 U

Office 2008 for Mac Home and Student Edition provides the basics of Office 2008 for Mac for and school users. This version includes three licenses for use by consumers and students b does not include connectivity to Microsoft Exc Server or support for automated workflows.

- Word
- Excel
- PowerPoint
- Entourage



3 User

SAVE $40 off RRP WebCode: MSA3770 **$189**

MICROSOFT PRICE CHECKER — Harris Technology $198 — JB Hi-Fi $227

Guaranteed to beat Dick Smith, Harris Technology, JB Hi-Fi and Officeworks on all Microsoft pro

See Page 3, 14, 18, 19 and 30 for more details! - Price Checker prices correct at time

Pioneer of Innovative Technology

$1,000 Bonus with Telstra Next G

reamBook Style M66/M54

om $699
inc-GST



he BEST VALUE notebook
tel Core Duo/Core 2 Duo Processor
p to 4GB DDR2 Memory
5.4/14.1" Widescreen WXGA Display
p to 128MB Integrated Graphics
ptional 802.11b/g Wireless, Bluetooth,
tegrated 1.3 Mega Pixel Camera

DreamBook Light IL1 (I'd love 1)

From $499
RRP inc-GST



- An amazing new notebook you'll absolutely love
- VIA C7-M 1.0GHz Processor
- 40GB Hard Drive
- Up to 1GB DDR2 Memory
- 7" Widescreen Display
- Optional In-built Camera & 802.11b/g Wireless
- 3-in-1 Card Reader, High Definition Audio

DreamBook Light M72/R

From $899
RRP inc-GST



- New ULTRA PORTABLE LIGHT-WEIGHT notebook
- Intel Core Duo/Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 12" Widescreen WXGA Display
- Up to 256MB SIS Integrated Graphics
- Optional Finger Print Reader
- 1.3MP Camera Free

DreamBook Style 9008

From $1,199
RRP inc-GST



- New CENTRINO 2 notebook
- Intel Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.4" Widescreen WXGA Display
- ATI Radeon HD 3470 256MB PCI Express Graphics
- Intel WiMax technology + Free Fingerprint Reader

reamBook Power 8227

om $1,099
inc-GST



ew HIGH PERFORMANCE notebook
tel Celeron-M/Core 2 Duo Processor
p to 4GB DDR2 Memory
7" Widescreen WXGA Display
Vidia GeForce Go 8600 512MB dedicated
CI Express Graphics
tegrated 1.3 Mega Pixel Camera

DreamBook Power M57T

From $2,799
RRP inc-GST



- New CENTRINO 2 notebook
- Intel Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- nVidia GeForce Go 9800GT 512MB
- 17.1" Widescreen WUXGA Anti-glare Display
- Intel WiMax technology + Free Fingerprint Reader
- 2 Mega Pixel Camera

DreamBook Power D90

From $2,999
RRP inc-GST



FIRST QUAD-CORE!!!

- The WORLD'S FIRST QUAD-CORE notebook
- Intel Core 2 Duo Q/X Series Processor
- nVidia GeForce Go 9800GT 512MB x2 SLI
- 17.1" Widescreen WUXGA Anti-glare Display
- 3 x SATA2 Hard Drives with RAID 0/1/5 support
- Optional TV Tuner, 1.3 Mega Pixel Camera, Wireless 802.11b/g/n, Bluetooth

DreamBook Style 825

From $949
RRP inc-GST



- High performance notebook featuring Intel's new Santa Rosa chipset!
- Intel Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.4" Widescreen WXGA Display
- nVidia GeForce Go 8600GS 512MB PCI Express Graphics

reamMicro SOHO Server 1U
48

om $1,299
inc-GST



lim form factor (1U) server ideal for
letwork Infrastructure or Web Applications
n-site service and support packages available
tel Dual Core / Quad Core Xeon Processor
p to 8GB DDR2 ECC Memory
p to 4 SAS/SATAII Hot-Swap HDD RAID 0/1/10/5
VM over IP, Remote Management, 3 x Lan

DreamMicro 2U SAS to SAS/SATA JBOD System 1200

From $3,599
RRP inc-GST



- 2U 12 x hot-swappable drive bays with key-lock
- Dual active-to-active, fail-over SAS JBOD I/O Modules
- Two 3Gb/s SAS Ports on each SAS I/O Module
- 500W Redundant hot-swappable power & cooling modules
- GUI based SES Management Tool to monitor the system
- Online Firmware Upgrade ensures system's high availability
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